Products finishing

Volume 10 JUNE, 1946 Number 9

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Products Finishing

The A. E. S. and the Future - - - -

As the electroplaters convene in their first national meeting of the postwar era, they can well claim a share of the esteem and honor being heaped upon present-day scientific workers for their part in the winning of the war. Nothing could be more certain than that in electroplating, wartime accomplishments will definitely influence the future. The ability of the plating industry to fill the demands of war by acting as a "reserve" ready to step in on short notice to meet the shortages of materials normally used justifies the conviction that plating will play a large part in the technological developments of the future.

While A. E. S. conventions have always been full of educational opportunities, this 33rd Annual Convention in Pittsburgh, June 17-20, is really "loaded" with valuable and useful information. The organic symposium will provide first-hand information on new and improved organic tank linings...rack coatings...protective coatings...decorative finishes.

There also will be data on continuous strip plating which will bring up one of the liveliest subjects in the industry and opportunities will be available to inspect various strip plating lines in actual operation. Electrodeposition of tin and zinc on continuous strip in steel mills has shown remarkable progress, and increased metal supplies in the near future are expected to accelerate interest in the production and application of electrolytic tin and zinc coated strip.

The convention will also present the opportunity to meet the A. E .S. research committee organization and to bring home suggestions about practical applications of their results to everyday plating problems. In these days when research plays such an important part in modern production methods, the A. E. S. is commended for its sponsorship of research on such fundamental problems as porosity, adhesion, surface finish, thickness determinations, stripping methods, purification of plating baths, and others. The research program includes in its scope both fundamental and practical problems, the results of which promise to be of great value to manufacturers as well as to individual members. This program was made possible through the creation of the A. E. S. Research Fund, subscribed by Society members and Branches as well as by industrial concerns.

Reconversion problems in the plating industry were not as difficult as they would have been in an industry where peacetime requirements were entirely different from wartime requirements. With the end of hostilities, much of the industry was immediately ready to supply domestic goods with the conventional bright finishes of copper, nickel, and chromium using much the same equipment. Many firms are using electroplating for the first time, conducted either in new plants installed by them or in job plating plants. Here is the golden opportunity for the plating industry to retain the interest of such firms as we enter this postwar period of production. To do so, the industry and the individual must be resourceful and adaptable as well as industrious. The A. E. S. can do much to apply and extend the knowledge of electroplating.

JUNE, 1946 Vol. 10, No. 9

A. E. S. 33rd National Convention

Official Program of A. E. S. 33rd National Convention

June, 1946—Pittsburgh, Pennsylvania

Hotel William Penn, Convention Headquarters

★

Sunday Afternoon — June 16th — 3:00 P. M.

REGISTRATION

William Penn Hotel — Seventeenth Floor

Take the Express Elevators from the Main Lobby.

Monday Morning — June 17th — 10:15 A. M.

OPENING SESSION

Urban Room — William Penn Hotel

Invocation.....Reverend Frank C. Mesle

Formal Opening of 1946 Convention, S. S. Johnston, Convention General Chairman
Welcome to Pittsburgh.....Hon. David L. Lawrence, Mayor, Pittsburgh
The Pittsburgh Branch Appreciates....Frank R. Keller, President, Pittsburgh Branch
Report of the Supreme President.....Walter L. Pinner, A.E.S. Supreme President
Adjournment — 12:00 Noon.

All Educational Sessions are scheduled to be held in the Urban Room, Seventeenth Floor, William Penn Hotel. Take the Express Elevators from the Main Lobby.

Monday Afternoon — June 17th — 2:00 P. M.

FIRST EDUCATIONAL SESSION

Chairman, W. M. Phillips, General Motors Corporation

1. "*Wartime Plating Developments in England*"
   A. W. HOTHERSALL, Woolwich Arsenal, England
2. "*Summary of Wartime Research on Plating at the National Bureau of Standards*"
   W. BLUM, U. S. Bureau of Standards
3. "*Deposition of Nickel by Chemical Reduction*"
   ABNER BRENNER and GRACE E. RIDDELL, U. S. Bureau of Standards
4. "*Purification of Rhodium Plating Solutions*"
   ABNER BRENNER and WALTER A. OLSON, U. S. Bureau of Standards
5. "*X-Ray Diffraction Studies of Electrodeposits*"
   THEODORE VOYDA, Pratt & Whitney Aircraft
6. "*Electropolishing—What Is Its Status Today?*"
   CHARLES L. FAUST, Battelle Memorial Institute

Monday Evening — June 17th — 9:00 P. M.

INTERNATIONAL FELLOWSHIP CLUB OPEN HOUSE

Ballroom — William Penn Hotel

This evening's entertainment is sponsored by the International Fellowship Club. A ticket for the event is included in your registration booklet.

Dancing, Refreshments and Get-Acquainted Period

Tuesday Morning — June 18th — 9:00 A. M.

SECOND EDUCATIONAL SESSION

Chairman, E. S. Taylerson, Carnegie-Illinois Steel Corporation

1. "*Corronizing Wire Screen Cloth Using Radiant Heating*"
   J. EDWARD BEMILLER, Hanover Wire Cloth Company; DAMON C. ANTEL, Pittsburgh Branch
2. "*Some Observations on Alkaline Electrotinning*"
   T. G. TIMBY, Jones & Laughlin Steel Corporation

3. *"Tin Plating of Strip Steel at High Speed"*
   G. C. JENISON and S. S. JOHNSTON, Weirton Steel Corporation
4. *"Examination of Electro-Cleaned Steel by the Diffraction Technique"*
   C. W. SMITH and I. L. KARLE, Detrex Corporation
5. *"Disposing of Plating Room Waste Liquors in Compliance with Stream Pollution Laws"*
   C. J. LEWIS, Warner Company

Tuesday Afternoon — June 18th — 1:00 P. M.

PLANT VISITATION

Delegates are invited to visit any one of the plants listed below.* In order that the committee may make adequate bus arrangements, it is requested that trip preference be registered at the Plant Visitation desk when registering for the Convention. A ticket good for transportation to and from the particular plant will be issued in the registration book.

Aluminum Company of America Research Laboratories, New Kensington, Pa.

These Research Laboratories are the largest in the country devoted to research work on light metals. Here the visitor will see the largest testing machine of its kind in existence. This machine develops a million pounds in tension and three-million in compression. Many other interesting features will be shown.

Carnegie-Illinois Steel Corporation, Pittsburgh, Pa.

One of the large steel producing plants in the Pittsburgh area will be visited. The spectacular, basic manufacture of steel will be demonstrated.

Jones and Laughlin Steel Corporation, Aliquippa, Pa.

In this plant, continuous electrotinning utilizes the alkaline type electrolyte. J & L, with the Metal and Thermit Company, pioneered and developed the potassium stannate bath. The strip is plated, the coating fused and oiled and the strip then recoiled. The coils are cut into sheet lengths, inspected and bundled in another operation.

Standard Steel Spring Company, Coraopolis, Pa.

This is a large plant devoted to the fabrication and fully automatic plating of automobile bumpers and bumper bars. This includes copper, nickel and chromium with attendant operations of cleaning, buffing, etc.

Weirton Steel Company, Weirton, W. Va.

Three plating lines are utilized here, two for tin and the other for plating zinc in strip form. Weirton, with Du Pont developed the Halogen (acid type) tin bath. A modified zinc sulphate is used in the zinc line. The strip is plated and, in the case of tin, the coating is fused and oiled and the strip is then recoiled. Cutting of the coil to sheet length, inspection and bundling are separate operations. The zinc coated strip may be Bonderized or not, recoiled and either shipped as coils or cut to length in another operation.

*The companies here listed reserve the right to refuse admittance to any individual whose presence they feel is prejudicial to their interests.

Tuesday Evening — June 18th — 6:30 P. M.

JOB PLATERS' DINNER MEETING

Chairman, R. J. O'Connor

Cardinal Room — William Penn Hotel — Seventeenth Floor

WITH OVER 45 years' experience, Alvey-Ferguson is uniquely qualified to engineer, manufacture and install *completely conveyorized and coordinated* cleaning and finishing systems.

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If you make metal parts or products, you have a cleaning and finishing problem . . . and Alvey-Ferguson can help you solve it. Write for consultation without obligation—today.

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Alvey-Ferguson

Tentative Program

1. *"A Review of Developments in the Job Plating Industry in 1945"*
2. *"A National Organization of Job Platers"*

Be sure to make your reservations for this Dinner and Meeting when you register.

Wednesday Morning — June 19th — 9:00 A. M.

THIRD EDUCATIONAL SESSION

Chairman, Kenneth Tator, Industrial Lining Engineers

1. *"The Effect of Surface Preparation on the Durability of Organic Coatings"*
   V. M. DARSEY, Parker Rust Proof Corporation
2. *"Evaluation of Organic Finishes"*
   EDWARD H. BUCY, Zapon Division, Atlas Powder Company
3. *"Natural and Synthetic Rubber in the Electroplating Field"*
   H. C. KLEIN, Goodrich Rubber Company
4. *"Resins of the Vinyl Family in Metal Finishing"*
   F. L. SCOTT, Organic Division, United Chromium, Incorporated
5. *"Characteristics of Certain Plastic Films and Coatings"*
   J. K. SHACKLETON, Plastics Department, E. I. du Pont de Nemours & Company, Incorporated

Wednesday Afternoon — June 19th — 2:00 P. M.

FOURTH EDUCATIONAL SESSION

1. *"Research in Electroplating"*
   C. E. HEUSSNER, Chairman, Research Committee
2. *"Introduction to Reports of Research Projects"*
   R. M. WICK, Chairman, Research Directing Sub-Committee
3. *"Stripping of Copper from Various Base Metals"*
   F. C. MATHERS (Indiana University), Project Director (Project No. 1)
4. *"Determination of Impurities in Electroplating Solutions"*
   E. J. SERFASS (Lehigh University), Project Director (Project No. 2)
5. *"Methods for Testing the Adhesion of Electrodeposits"*
   A. L. FERGUSON (University of Michigan), Project Director (Project No. 3)
6. *"Effect of Surface Finishing of Non-Ferrous Base Metals on Protective Value of Plated Coatings"*
   DR. WM. BLUM (National Bureau of Standards) (Project No. 4)
7. *"Present Trends in Legislation Affecting Research and Patents"*
   R. C. WATSON, Research Committee Counsel
8. *"Effect of Impurities and Purification of Electroplating Solutions"*
   PROF. D. T. EWING (Michigan State College), Project Director (Project No. 5)
9. *"The Nature and Effect of Porosity in Electrodeposits"*
   DR. N. THON (Princeton University), Project Director (Project No. 6)

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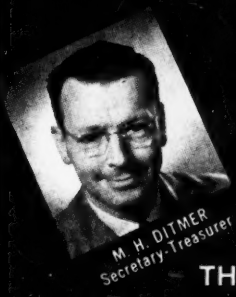
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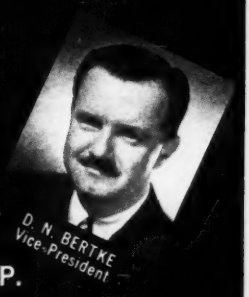
D. N. BERTKE
Vice-President

THE TEXO CORP.

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Representatives in Principal Cities

10. *"Methods of Testing Thickness of Electrodeposits"*
PROF. H. J. REED (Pennsylvania State College), Project Director (Project No. 7)
11. *"Polarization at Electrodes in Electroplating Processes"*
PROF. A. L. FERGUSON (University of Michigan), Project Director (Project No. 8)
12. *Closing Remarks*
C. E. HEUSSNER, Chairman, Research Committee

Wednesday Evening — June 19th — 8:00 P. M.

INFORMAL GET-TOGETHER

Urban Room — William Penn Hotel

Did you miss talking to Bill Jones this morning? Make a date to see and talk to him here. Do you have a pet problem in your plant or process? You can find sympathy and maybe some information here. Come and visit with those fellows you haven't seen for a long time. Informal, impromptu and off-the-record.

Thursday Morning — June 20th — 9:00 A. M.

FIFTH EDUCATIONAL SESSION

Chairman, Ellsworth Candee, American Brass Company

1. *"Plating with the Acid Copper Solution"*
GEORGE SCHORE, Atlantic Aircraft Supply Company
2. *"A Periodic Chart for Electroplaters"*
GEORGE DUBPERNALL, United Chromium, Incorporated
3. *"Manodizing and Dye Coloring Magnesium Alloys"*
PAUL R. CUTTER, Hanson Van Winkle-Munning Company
4. *"Practical Techniques of Polishing and Buffing Compounds and Their Application"*
HOWARD J. McALEER, Formax Manufacturing Company
5. *"Parkerizing: Growth or Shrinkage"*
N. A. TOPE, Humber, Ltd., England

Thursday Afternoon — June 20th — 2:00 P. M.

FINAL BUSINESS SESSION

Urban Room — Seventeenth Floor — William Penn Hotel

Election of Officers
Selection of the 1947 Convention City

Thursday Evening — June 20th — 7:00 P. M.

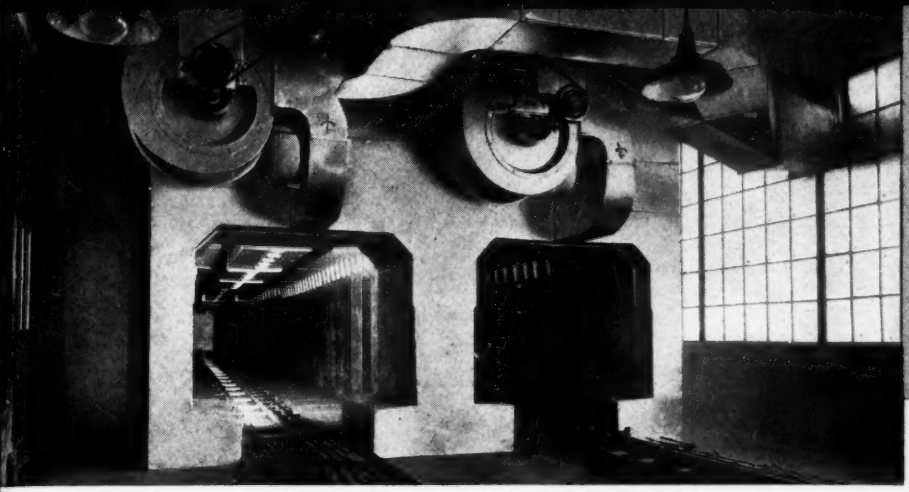
BANQUET

Ballroom — Seventeenth Floor — William Penn Hotel

Banquet, Stage Show and Dancing
Distribution of Awards

SYSTEMS

for ENAMEL • LACQUER • PAINT • VARNISH



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Regardless of the size or shape of the product to be finished—from household appliances to railroad cars—a Finishing System in its entirety must be planned, coordinated and thoroughly engineered throughout to produce required results in each phase of the finishing process. Illustrations on this page show units of the largest and most complete Finishing System in the world today . . . it is new throughout, and it is turning out a finishing job that has caused revision of former concepts of fine finishes in the automotive industry. Such achievements, in this highly specialized field, are realized only after years of pioneering, intensive research and constant development in methods and equipment. If you have a finishing problem in your plant today, or are contemplating new equipment of this type, call on the broad experience of Mahon engineers—they bring to you a wealth of technical knowledge and practical know-how not available to you elsewhere.

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AHON

Finishing at United Platers, Inc. of Detroit

By BRYANT W. POCOCK

UNITED PLATERS, INC., at 994 Madison Avenue, Detroit, is one of Michigan's largest job finishing plants. Centrally located in the heart of the world's automotive capital, this company knows the meaning of the word, busy. Every square foot of floor space amounting to 35,000 square feet on two floors is designed to expedite the handling and flow of work, and no effort has been spared to install the most modern and efficient equipment.

The plant is divided into a large number of integral departments. The barrel department (Fig. 1) occupies a large room at the west end of the first floor, where 125 tons of stampings, nuts, bolts and other small parts are cadmium and zinc plated daily. Udylite barrels and tanks are used, with exhaust ducts of United's own design maintaining adequate ventilation with a breathable, healthy atmosphere at all times. A Pangborn dust collector on the roof protects the community around the plant from smoke, soot and fumes.

Barrel work is first immersed for 7 minutes in a hot solution of a proprietary alkaline cleaner using no current. The second tank is a cold water rinse. The third serves as a cold dip tank, containing 18-degree Baumé muriatic acid. The fourth is a cold water rinse, and the fifth and sixth are replicas of

(Above) Fig. 1—Barrel plating department where the production plating of cadmium and zinc is performed

the first tank. These six tanks comprise a single production line.

The second line in the barrel department is the cadmium plating setup. In this line, work enters via a loading tray under water, after which it is transferred to a plating barrel and passed through a Udylite unit. A conventional bath is used containing no brighteners other than gelatin. The average barrel load is 250 lb. Plating temperature is 75 deg. F. at 15 volts, 400 amperes. Average plating time is 25 minutes.

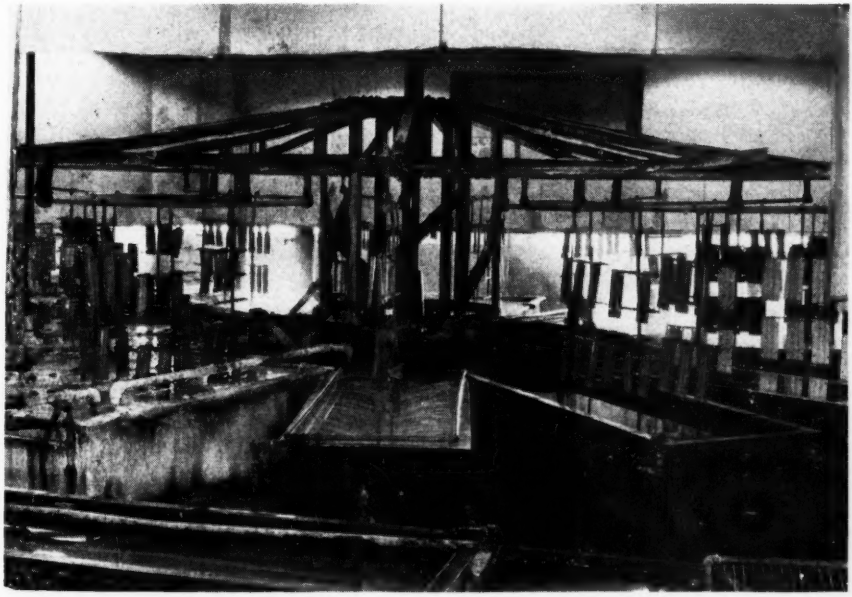
The third barrel line is the zinc line, the plating bath being Du Pont's Zin-O-Lyte for bright zinc. The average barrel load here is 200 lb. Plating temperature is 80 to 90 deg. F. at 15 volts, 400 amperes, and average plating time is 35 minutes.

Routine cadmium and zinc barrel work is passed through commercial dryers, the sequence being cold and hot water followed by hot air. Special work is centrifugally dried. All electrical contacts on barrels are cleaned at frequent intervals with a steam nozzle, and anode bars are submerged completely to maintain electrical contact and prevent corrosion. Barrel bearings are greased under pressure.

In addition to the above, a Stevens automatic is used in the barrel department for special cadmium plating, all work for which is hand cleaned. Cleaning and tumbling barrels are also available in this department for sand tumbling and mechanically cleaning spring steel without the use of acids so as to eliminate any possibility of embrittlement. There are also two tanks equipped with special ventilating ducts for Parkerizing.

Figure 2 shows United's Udylite "Udymatic" 15-station umbrella type

Fig. 2—Udylite "Udymatic" 15-station umbrella-type automatic plating machine used at United Platers



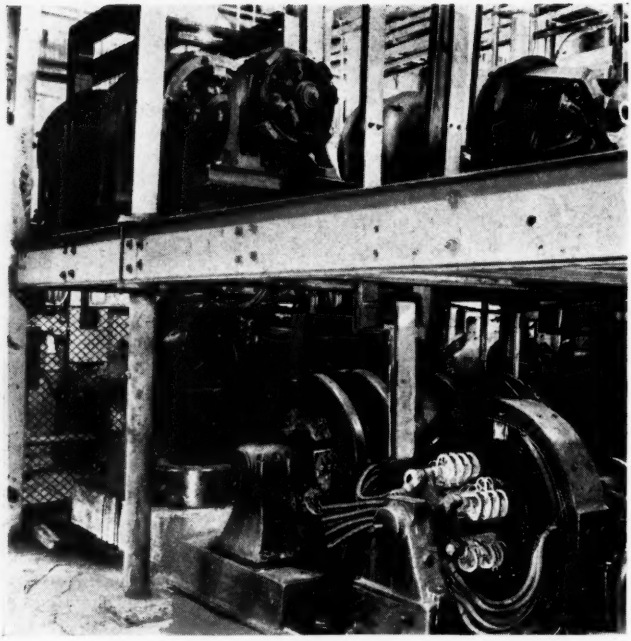


Fig. 3—View of main generator room at United Platers

automatic plating machine in the act of rising to switch tanks. This machine, located near one end of the large central room of the first floor, is separately housed and separately catwalked. It is used for zinc plating, a conventional cyanide bath being employed. The machine is operated on a 4-minute lift, the 15 stations being as follows:

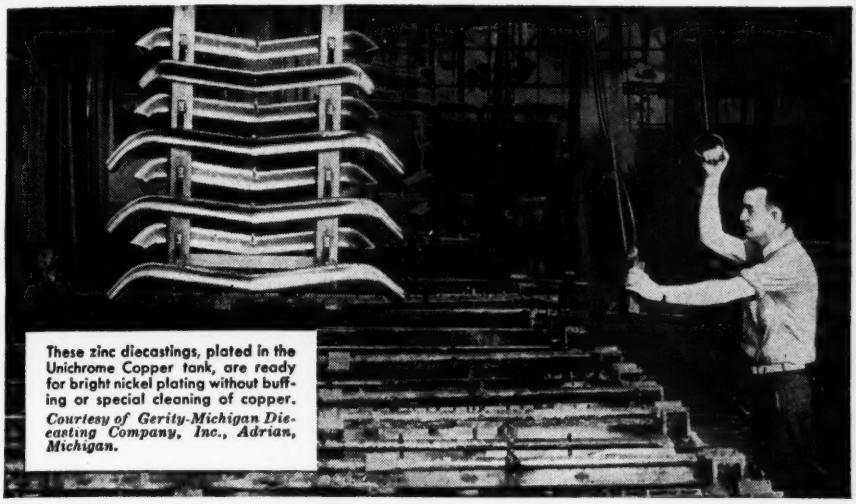
1. Loading station.
2. Soak tank, hot immersion type proprietary alkaline cleaner.
3. Electrolytic cleaner, hot electrolytic type proprietary alkaline cleaner.
4. Cold water rinse.
5. Pickling tank, concentrated muriatic acid.
6. Cold water rinse.
7. Electrolytic cleaner, hot electrolytic type proprietary brand alkaline cleaner different from that used at station (3).
8. Cold water rinse.
9. Plating bath.
10. Plating bath.
11. Plating bath.
12. Plating bath. When the machine operates on 4-minute lift, this is equivalent to 16 minutes of plating time, producing a plate of approximately 0.0004 inch average thickness.
13. Combination immersion and spray rinse, cold water.
14. Cold water rinse.
15. Hot water rinse.

All work from the Udymatic, whose shape lends itself to the formation of water pockets, is air dried in an oven at 200 to 250 deg. Fahrenheit.

United's large still plating department on the first floor is used for all heavy production plating, including cadmium, zinc, chromium, tin, lead, copper, bright nickel, gray nickel and Parkerize. All tanks are equipped with Udylite rheostats and with Udylite agitators for mechanical agitation. A common cleaning procedure is employed for all of these operations, which in effect constitutes a double cleaning. The steps are as follows:

1. Electrolytic cleaning in hot solution of proprietary brand electrolytic cleaner.
2. Cold water rinse.

NO NEED TO BUFF COPPER ON ZINC DIECASTINGS



These zinc diecastings, plated in the Unichrome Copper tank, are ready for bright nickel plating without buffing or special cleaning of copper.
Courtesy of Gerity-Michigan Diecasting Company, Inc., Adrian, Michigan.

...WITH UNICHROME COPPER PLATING

IN one of the largest plating plants in the country, Unichrome Copper again proves it does a top quality job at low cost. Gerity-Michigan Diecasting Company, Inc. does bright plating on difficult work like these zinc diecast, automobile grille bars . . . without buffing the copper prior to bright-nickel plating. For the Unichrome process deposits a dense plate of exceptional smoothness and luster.

Moreover, Unichrome Copper operates over a wide range of current densities . . . and plates at high speeds. It saves plating time while producing results of highest quality.

In Unichrome Copper, you will find the right start to the finest chromium plating job on any of the commonly-plated base metals. Write for your copy of the fact-full Unichrome Copper bulletin.

Other Advantages of Unichrome Copper*

- Mildly alkaline—non-corrosive bath easy on racks and equipment
- Non-toxic solution—no cyanide
- Non-gassing—no ventilation necessary
- Moderate temperature operation—cuts down heating losses
- High anode current densities—fewer anodes, clean anodes
- Deposit is clean—requires no activation

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Detroit 7, Mich. • Waterbury 90, Conn. • Chicago 4, Ill. • Dayton 2, Ohio

OTHER U. C. PRODUCTS AND PROCESSES: Chromium Plating • Porous Chromium • *Unichrome Dips • *Unichrome Strip *Anozinc Compounds • *Unichrome Rack Coatings • *Unichrome Stop-Off Lacquers and Compounds • *Unichrome Clear and Pigmented Lacquers • *Ucilon Protective Coatings.
*Trade Mark Reg. U. S. Pat. Off.

3. Muriatic acid pickle.
4. Cold water rinse.
5. Second electrolytic cleaning in hot solution of proprietary brand electrolytic cleaner different from that used in first cleaning operation.
6. Cold water rinse, then into plating bath.

The steps after plating are likewise common to this department. These are:

1. Cold water rinse.
2. The necessary bright dips.
3. Cold water rinse.
4. Hot water rinse.
5. Drying.

In common with all other departments at United Platers, the characteristics of solutions in the still plating department are under direct supervision of the well-equipped control laboratory. Typical data are as follows:

Cadmium:

Cd	3.5	4.0	oz./gal.
NaCN	12.0	14.0	oz./gal.
NaOH	1.0		oz./gal.

Zinc:

Zn	3.5	4.5	oz./gal.
NaCN	10.0	12.0	oz./gal.
NaOH	8.0	10.0	oz./gal.

Tin:

Na_2SnO_3	16.0		oz./gal.
NaOH	1.6		oz./gal.

Lead:

Fluoborate 23-25 deg. Baumé

Figure 3 shows the large generator room on the first floor. This room, built on two levels, houses 8 generators ranging from 2,000 to 5,000 amperes capacity. The entire room supplies the still plating department, including power for electrolytic cleaning, all cleaning units being run by a single 5,000-ampere generator. Each nickel tank has its own individual generator, and an additional separately

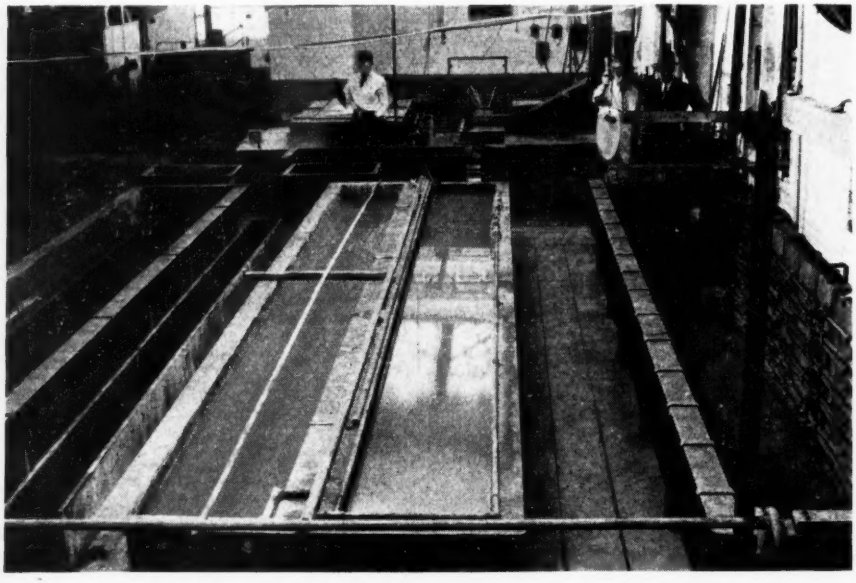
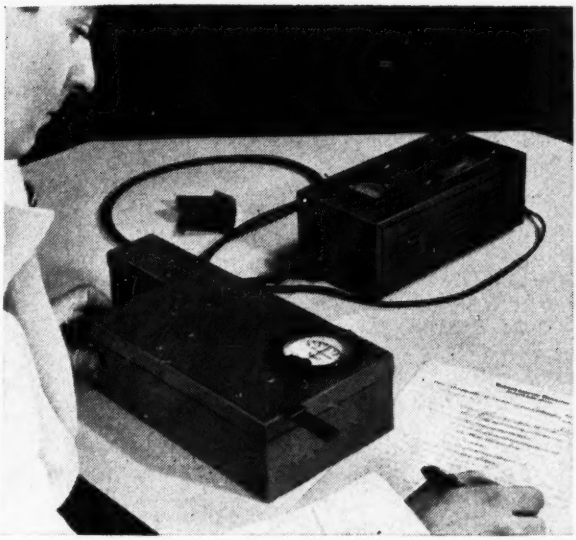


Fig. 4—View of anodizing and hot-dip departments with large tanks for Alumilite process shown in foreground and hot-dip tanks in background



The way to a better burnishing compound

• *By means of the reflectometer, a research man at Wyandotte Chemicals Corporation determines the relative reflectivities of brass plates burnished with various compounds and finds how improvements can be made. The result of such study was Wyandotte Burnishing Compound 315.*

IN Wyandotte Burnishing Compound 315 you have a *new* development! It contains no cyanide to cause you annoyance and hazard. Yet it removes tarnish from copper-base alloys, brass, bronze and copper more thoroughly than the old-type cyanide treatment.

Wyandotte Burnishing Compound 315 rinses freely from the work and burnishing balls — leaving no objectionable soap films to dull the work or hard water scum to necessitate frequent cleaning of equipment. Finished articles have a bright and lustrous surface.

Let your Wyandotte Representative show you how Wyandotte Burnishing Compound 315 can give you satisfaction. He's always at your service.

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WYANDOTTE, MICHIGAN • *SERVICE REPRESENTATIVES IN 88 CITIES*

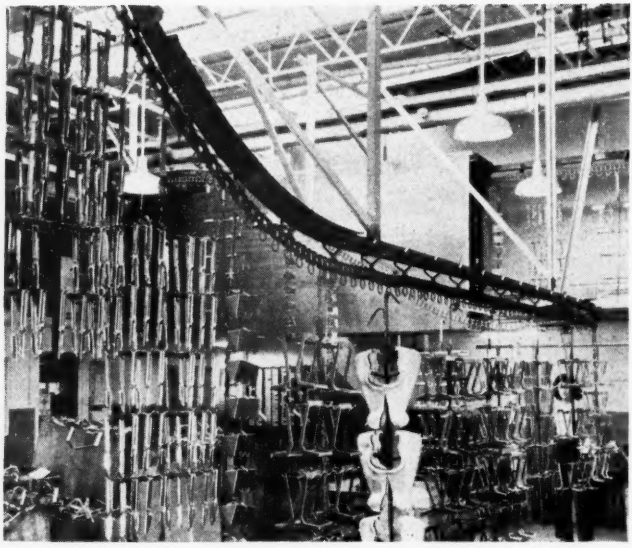


Fig. 5—View of main racking room at United Platers, Inc., with hot air dryer built around monorail shown in background

housed 5,000-ampere generator supplies the cadmium, copper and zinc still tanks. The Udymatic has its own 5,000-ampere generator housed on the floor above. The first floor barrel department is supplied by a series of five Udylite rectifiers rated at 1,500 amperes at 6 volts, or 750 amperes at 12 volts, and a 3,000-ampere 12-volt generator.

Figure 4 shows the anodizing and hot-dip departments, which are located side by side at the east end of the ground floor. This large room houses equipment for both sulfuric and chromic acid anodizing, electrolytic polishing, hot lead, hot tin and hot galvanizing dips, and a complete sandblasting unit.

Sulfuric anodizing is done by the Alumilite process in a 3,200-gallon tank equipped with both heating and refrigerating coils. Also used are cleaning and rinse tanks and a hot water sealing tank, the effect of hot water being to harden the anodized surface and draw out the last traces of sulfuric acid. The procedure calls for 30 minutes of sealing to follow 30 minutes of processing.

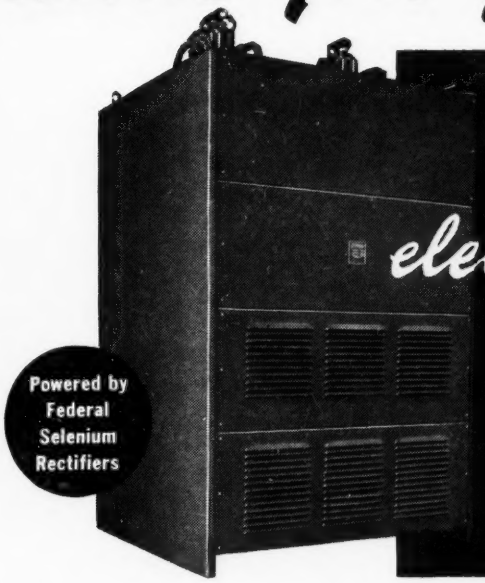
The chromic acid anodizing tank is operated between 80 and 90 deg. F. at 40 volts. The chromate is maintained between pH 0.7 and pH 0.9 and concentration is from 8 to 9 degrees Baumé. Aluminum is processed for about 60 minutes, then rinsed. Magnesium and Dowmetal are given a dichromate dip in potassium dichromate for 45 minutes to 1½ hours at 200 to 210 deg. F. as a bond for organic finishes.

In preparation for all anodizing, the work is cleaned by immersion in a solution of a proprietary brand cleaner of 3 to 5 oz./gal. concentration at 180 to 210 deg. F. for about 10 minutes. If the work is to be anodized, it is cold rinsed and then processed. If it is to be dichromated, it is cold rinsed after cleaning, then given a 5-minute immersion in 20 per cent hydrofluoric acid, followed by a cold rinse and processing. Dichromated work is finished by cold and hot water rinses and final drying.

The following steps are common in preparation for all hot dip coatings:

1. Immersion in a boiling solution of a proprietary brand cleaner at 12 oz./gal. concentration.
2. Cold water rinse.

What you get... IN



FEDERAL'S *electroplating* POWER SUPPLIES

(From 100 to 50,000 amperes)

1. *FLEXIBILITY* — achieved by grouping of various units to meet a wide variety of voltage and current requirements. Permits installations with no obsolescence.

2. *CURRENT CAPACITY* — for every requirement — from 100 to 50,000 amperes ... voltage ranges are available for standard and special electrolytic processes.

3. *SELENIUM RECTIFIERS* — for high-efficiency, quiet operation, practically unlimited life. Federal's "center contact" permits positive sealing against corrosion.

4. *PUSH BUTTON, REMOTE CONTROL* — On the larger installations motor-operated voltage regulator provides smooth, continuous, *precise* control.

5. *EASY INSTALLATION* — Compact design permits Federal rectifiers to occupy small floor space ... no heavy moving parts demanding special foundation or supports.

6. *LOW-COST MAINTENANCE* — Built to give continuous 24-hour service with no maintenance other than routine cleaning of blowers and motors. Air filters available for severe conditions.

Let a Federal engineer help you select, and give you the complete details on the rectifier to fit your needs. They're available *now!*

Federal Telephone and Radio Corporation

Export Distributor:
International Standard Electric Corporation

Newark 1, New Jersey

An IT&T Associate

3. Pickling in concentrated muriatic acid at room temperature.
4. Application of commercial flux.
5. Hot metal dip.

Large parts are dipped individually, small parts being basket dipped. Basket dipped work is put through a centrifugal machine which takes the place of wiping.

The anodizing and hot-dip departments are further equipped with Ruemelin cabinet and booth sandblasting units and a conventional tumbler. In addition to the above, an etching process has been worked out by the laboratory for aluminum articles requiring a satin finish for lacquering. This involves the following steps:

1. Cleaning in a solution of proprietary brand cleaner.
2. Immersion in a hot solution of caustic soda.
3. Cold water rinse.
4. Immersion in concentrated nitric acid at room temperature.
5. Cold water rinse.

A water-dip lacquer can be applied immediately after step (5) above, or parts may be dried in preparation for clear lacquer. In connection with anodizing, United Platers are interested in possible applications of the new procedures for coloring anodized surfaces by absorption of organic dyes.

For routine electrolytic polishing, United Platers make use of the Rustless process, which employs the citric acid-sulfuric acid solution. This is used primarily for 18-8 stainless steel wire products such as refrigerator shelves, and so on. This company is also experimenting with other solutions of its own design for the electrolytic polishing of aluminum, 18-8 stainless, 17 chrome steel and Monel metal. Engineers at United, while admitting that curved surfaces are more adaptable

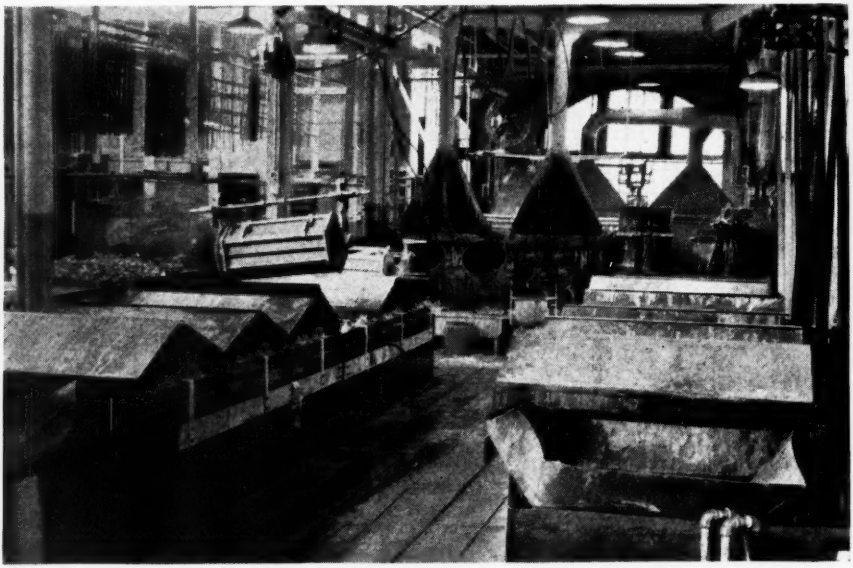
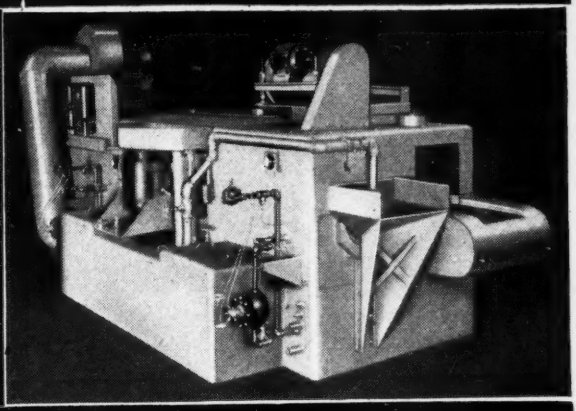


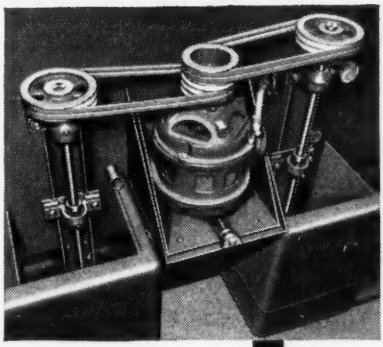
Fig. 6—Special precision barrel plating department in which oblique barrels are employed for small loads

Ransohoff EQUIPMENT
for the surface treatment of metals

A TWO-IN-ONE MACHINE

to wash, rinse and dry





...small work in drum section

...large work on conveyor belt

...equipped with Ransohoff *Packless* Vertical Centrifugal Pump

...equipped with UNI-DRAIN which combines all drains into one common drain leading to sewer.

Save space . . . save cost of multiple installations . . . everything compact and economical.

Let RANSOHOFF FIELD ENGINEERS tell you about washing . . rinsing . . drying . . pickling . . burnishing . . rust-inhibiting . . descaling . . de-burring . . sawdust polishing . . phosphate coating for paint base.

N. Ransohoff, Inc.

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Fig. 7—Partial view of well-equipped control and research laboratory at United Platers, Inc.

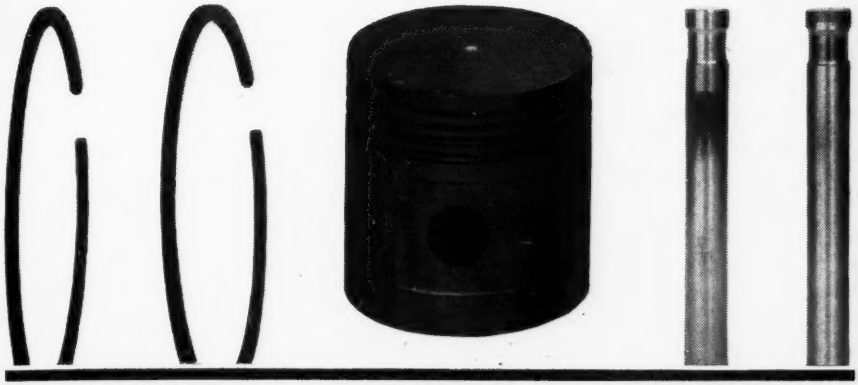
to electrolytic polishing, are not prone to accept the common belief that flat surfaces are not adaptable. Although their research is still in the experimental stage, results so far have been promising. They have succeeded, e.g., in polishing and buffing brass and copper electrolytically and believe that any small article difficult to polish by conventional means is adaptable to electrolytic polishing.

Additional equipment on the ground floor includes a gas-fired oven of United's own design for drying large parts. Another large "home made" oven supplied by steam-heated blowers has been built around the monorail system which feeds the ground floor (Fig. 5). This oven forms an integral part of the conveyor system and makes a very efficient dryer. A complete anode vault has been installed for storage of expensive chemicals, anodes and precious metals. All unnesessary overhead obstructions have been eliminated in order to afford a clear view, better lighting and ventilation, and the greatest possible room for moving parts.

Equipment on the second floor is primarily designed for job work requiring more exacting procedures, special treatments, and so on. The first unit here comprises tanks for copper, nickel, decorative and hard or industrial chromium. One 6,000-ampere generator supplies both chrome tanks. These are thermostatically controlled, the hard chrome tank being operated at 130 deg. F., the bright chrome tank at 113 deg. Fahrenheit.

The Rochelle salt copper bath and Harshaw's bright nickel bath are used in this department. This particular nickel bath has been found particularly well adapted for use with zinc die-cast alloys, as it is not very susceptible to the presence of zinc. The Udylite bath used on the first floor has been found excellent for steel.

Also available to this area of the



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PARCO LUBRIZING
Retards Wear

PARCO LUBRIZING
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Prevent Wear on Friction Surfaces
Save Finishing Costs on Wear Parts . . . with
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Parco Lubrizing is a simple, inexpensive chemical treatment which, without use of electric current, produces a non-metallic, oil absorbent coating on iron and steel surfaces. It prevents metal-to-metal contact of moving parts, hastens break-in period, and protects parts from excessive wear, scuffing and scratching. By reducing subsequent wear, it prolongs efficient life and operation.

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On some parts, final, costly machining to fine tolerances can be eliminated where Parco Lubrizing is used, to give break-in protection. Parco Lubrizing retards corrosion of metal parts in the stock bin and in operation. Send for our technical bulletin giving complete information.

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BONDERIZING	PARKERIZING	PARCO LUBRIZING
Holds Paint To Metal	Inhibits Rust	Retards Wear on Friction Surface

plant are two automatic polishing and buffing machines of United's own design equipped with interchangeable heads for all sizes of bolts. All plating racks in the plant are coated with rack lacquer. United Platers design and repair all of their racks, having their own well-equipped electrical and maintenance shop.

Figure 6 shows the unique setup on the second floor for precision barrel plating of small parts. The unit at the left of the aisle in the foreground contains 2 tin, 1 zinc and 3 cadmium tanks. The unit at the right (east) of the aisle has 1 lead, 3 bright nickel, 1 brass and 2 copper tanks. All of these tanks have sloping covers which open along the center to avoid contamination from drag-over of solutions on the barrels. At the end of the aisle in the center can be seen 3 oblique plating barrels. These are of steel lining with hard rubber, and each has its own controls. They are used for small loads. In order to obtain precision barrel plating in a still tank, as for example for the plating of watch instruments, United uses a utility barrel made by Lasalco. In the background of the same figure can be seen the larger copper, nickel and chromium still tanks described above. Note the ventilators above these tanks.

At the south end of this department are 3 rotor finishing units made by the Sturgis Products Company of Sturgis, Mich. Rotor finishing is a procedure for mechanically preparing a metal directly for plating from the "as received" condition. It includes deburring, rough and fine grinding, polishing and finishing. A brass or zinc die-cast part is polished to a high luster. Grinding is done by means of granite chips varying in size from No. 1 through No. 7. Limestone chips of the same gradation are used for polishing, in conjunction with an abrasive compound, and a high luster is obtained by using 1/16 to ⅛-inch steel balls.

Figure 7 shows United Platers' control laboratory. At the center background is a complete experimental plating unit used for laboratory research in new methods. A salt spray cabinet can be seen along the wall at the right background. A Beckman pH meter is on the center table behind the balance, and at the extreme left foreground are a Rockwell machine (covered) and an Eberbach electroanalyzing apparatus. Volumetric titrations are performed on the well-lighted table at the left, and a fume hood is available at the left background. Two chemists are employed full-time in this laboratory under the direct supervision of the chief chemist.

Another room which has proved its worth at United Platers is the conference room. Here there are held twice each month meetings of all key men from every department. Absolute frankness is encouraged at these meetings, during which discussions are held on all problems which have arisen since the preceding meeting. It is felt that these meetings have contributed more than anything else to promote the excellent management-labor relations which have prevailed during the firm's long existence.

"Protect Metal Surfaces in Power and Process Equipment Against Temperature Damage" is the title of a four-page comprehensive bulletin announced by The Dampney Company of America, Boston 36, Mass. The bulletin fully discusses "Thur-Ma-Lox" High Heat Resistant Coatings which are claimed to provide positive lasting protection to metal surfaces at any temperature up to 1,600 deg. F. Complete data on how the coatings are applied, as well as a list of typical applications, are included in the bulletin, copy of which is available free from Dept. T66 of the above mentioned company.

At first glance, all Nickel Anodes may look alike. It's what's behind the NUCAST 99+ NICKEL ANODE that tells its true value. When you buy "NUCAST 99+, you get these plus values: quicker starting and faster corrosion . . . smoother, thicker deposits and unusually low losses.

THE *NUCAST* PROCESS

a method of laboratory controlled production — originated and perfected by the Apothecaries Hall Company, insures the best obtainable results in your plating.

NUCAST *Distributors* are located in the following cities: Cincinnati, O.; Seattle, Wash.; Milwaukee, Wisc.; St. Louis, Mo.; Chicago, Ill.; Union City, N. J.; Rochester, N. Y.; Detroit, Mich.; New York, N. Y.; Philadelphia, Penna.

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BOX A

New Developments in Protective Coatings

By BURR PRICE

ALTHOUGH, industry-wise, the protective coatings manufacturers are continuing to keep their customers in the field of specialized products finishing supplied with a seemingly satisfactory amount of materials, they are definitely aware that a stepping-up of the output of metal consumer goods requiring enamels and lacquers might well put a pinch on them because of the continuing tightness of their own raw materials. They realize that their steel-using customers are short on surfaces which call for protective and decorative fnishes, and know that if the automotive, radio, and household appliance manufacturers got more steel, they would be hard put to it to supply the coating demands.

Marked shortages continue in phthalic anyhdride and glycerine, and the supply of titanium pigment will not be adequate for at least a year due to production bottlenecks, such as man power and the need for replacing machinery and equipment which was worked overtime during the war years and some of which is actually at the breaking-down point.

Industry ingenuity, which reached a high point during the war in the development of satisfactory substitutes for vehicles, is continuing to be exercised, but it is pointed out that this does not suffice to offset an under-supply of pigments.

A serious and unexpected shortage of tar acids which go into the making of phenolic resins is a new situation which is causing concern. It has been growing worse since first noted about the first of the year. The oil picture is none too rosy. Flaxseed control by the food authorities of the government is continuing to affect the linseed market. Soy bean oil is still short. Slight improvement is noted in the castor oil supply.

The shadow of OPA and price control creeps into the solvents situation. Butyl solvents affecting the lacquer industry are genuinely short, and, as the best source of this material is molasses, which brings better prices elsewhere, there are rumblings of complaint on this score.

In the meantime, the industry is continuing with its studies of its wartime developments, their use and methods of application. Results of long tests of zinc chromate primers were recently reported which should be of interest to aircraft, automotive, and marine fields and to users of non-ferrous metals. The fine properties of these primers were attested, but unsatisfactory results where noted where an iron oxide combination was used, which gave high hiding but which, because of the obviously better hiding, led to the stretching of the zinc chromate over too wide a surface. It was determined that there was a point in film

thickness below which it was unwise to go in using the primer, and these conclusions are being reported to manufacturers.

Another development of great value to the automotive market is the perfection of a method by which wood tones and wood designs are preprinted on a large flat metal sheet before fabrication into instrument boards, moldings, and parts for interior trim. Great simplification, time-savings and avoidance of much handwork are thus achieved. The steps are: (1) application of the primer and ground coat, (2) printing of the graining or wood tone design, and (3) application of the final glaze coat of lacquer. A unique feature of the new method lies in the engineering of the photographed design to allow for distortion on curves and angles of the car interior, which parts were previously finished by hand.

BURR PRICE

A practically "solid" material for impregnating magnesium and aluminum alloy castings has recently been reported. It is known as 988 Metal Impregnating Compound. As described by Paul Blackmore of Interchemical Corporation, it is a synthetic resin of the maleic alkyd type. It is 100 per cent solids and is quite heavy and viscous in nature. It is mixed with monomeric styrene to prepare the impregnating solution. Monomeric styrene is crystal clear and looks like any other ordinary solvent. It differs though, in that it is chemically reactive so that during baking, the styrene and resin combine or copolymerize. When polymerization takes place, the thin impregnating solution converts to a solid, and herein lies the most important principle or advantage of this type of impregnating solution. Because the styrene and resin are reactive, very little shrinking occurs, and thus, it is exceptionally efficient for sealing pores. Also, because it is a heat-converting type of material, baking can be done under pressure in the presence of an inert gas, such as carbon dioxide or nitrogen.

Impregnation is by vacuum where parts are placed in a large tank so that a vacuum of 28 inches can be drawn. This provides for the removal of all gases and air within the pores, after which the liquid is drawn into the tank, covering all parts. Air pressure is then applied to further force the solution into the pores. Parts are then removed and cleaned in the usual manner, and then the baking is done.

The protective coatings industry has available two types of finishes to conform to Quartermaster specifications for use on the 200,000 metal caskets to be used in burial of the war dead in many parts of the world. The finishes are of the bronze metallic type; one is a baked synthetic finish and the other an air-dry lacquer finish, which can be used at the option of the casket maker. An unusual feature of these metal caskets, contracts for some of which have already been awarded, is that they are to be stamped out in three pieces from dies to be supplied by the government; one stamping produces the bottom and sides, the second the top, and the third the foot rests. The Army dies have been delayed in completion, but the govern-

ment is ready to supply Navy dies to expedite the work of fabrication and finishing.

1946 Modern Plastics Encyclopedia. Published by Plastics Catalogue Corp., 122 E. 42nd St., New York 17, N. Y. Approximately 1,400 pages. Illustrated. Price, $6.00 ($7.00 in Canada and foreign countries).

Divided into 12 basic sections, this encyclopedia affords a comprehensive guide to the manufacture and use of plastic materials. It is completely illustrated and supplemented by exclusive charts and tables. The charts, which cover such subjects as plastic properties, raw materials manufacture, solvents, plasticizers, and so on, are extremely large and comprehensive. Ten of them are folded into a special envelope which is contained in each copy of the encyclopedia. A series of identifying labels is also enclosed for reference to the various charts.

Especially interesting is the encyclopedia's opening section, which is a short handbook of plastic material manufacture, processing, end-use possibilities, and production statistics. The various combinations of plastics and wood are given an entire section in the encyclopedia.

The technical data section of the encyclopedia provides a condensed engineering handbook on plastics and brings the A.S.T.M. specifications of plastics up to date. In the plastic materials section, 53 articles cover all commercial molding, extruding, and casting compounds. Also included are a chapter on casting resins and up-to-date information on the newer resins such as allyls, unsaturated polyesters, silicones, furanes, expanded plastics, and polyethylene. The sections on engineering design, machinery and equipment, laminates, and vulcanized fiber have been enlarged and revised over sections published in previous issues of the catalog.

Moreover, the encyclopedia contains a bibliography which lists the latest books and magazine articles on plastics, and a glossary giving the official definitions of technical plastic terms. A directory section lists the names, addresses, and personnel of all categories of plastic manufacturers.

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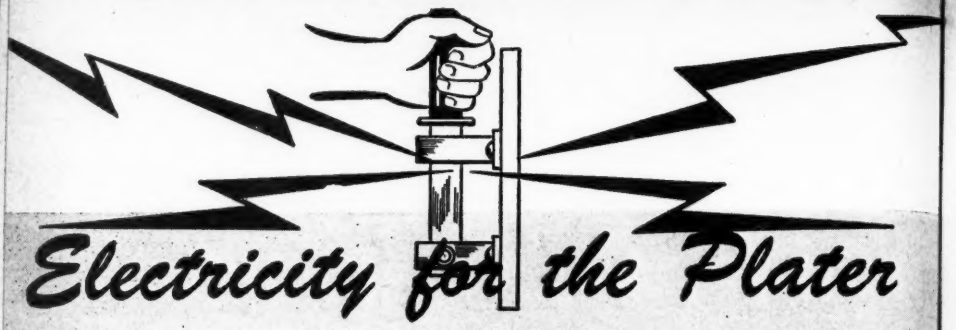

Electricity for the Plater

D. A. COTTON

Part XI

CONTINUING the discussion of power supply sources for electroplating, loads consisting of lamps, resistor heaters, and plating solutions have unity power factor; induction motors, welders, induction furnaces, and arc furnaces have lagging power factor; synchronous motors and power condensers have unity or leading power factor.

When planning new induction motor drives, sizes should be selected that will ensure their being operated at full load, since underloaded motors have very low power factor. Use of slow-speed induction motors should be avoided, if possible, as their power factor is inherently low even when fully loaded.

A little consideration of the factors involved will show that it is very essential for economy sake to have unity power factor in power circuits. Suppose a 220-volt, 3-phase power system in a plant is designed to carry 1,000 amperes. At unity power factor, this means that 220 x 1,000 x 1.73 = 380,000 watts or 380 kw. could be utilized. However, if the plant power factor is only 0.70, then, when the conductors

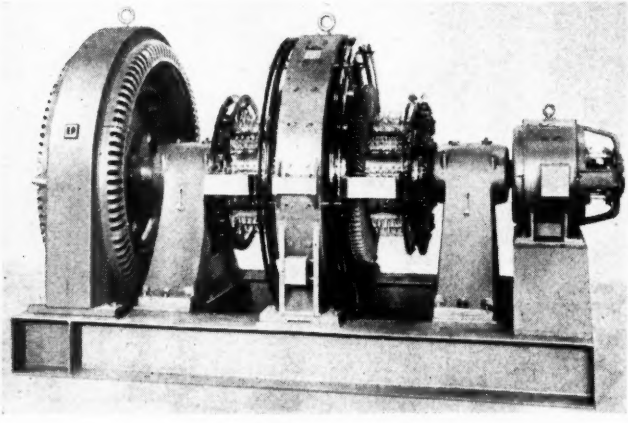

Fig. 52 — Plating motor-generator set *(Photo courtesy The Electric Products Co., Cleveland, Ohio)*

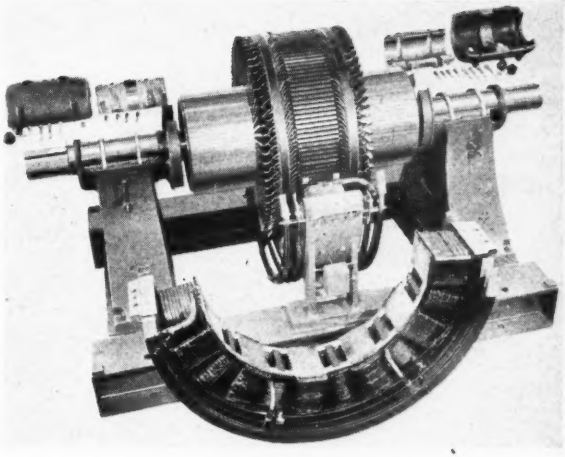

Fig. 53 — Exploded view of d.c. generator
(Photo courtesy The Electric Products Co., Cleveland, Ohio)

are loaded to their designed limit, there is a load of 380 kva, but only 0.70 x 380 or 26 kw. of useful power is available. It is evident that 114 kva of useless load is being carried by the system.

Low power factor causes poor voltage regulation and high line losses, which will result in lowered production, poor lighting, and many other undesired conditions. In addition, companies selling power usually exact penalty charges from customers having low power factor loads.

Since synchronous motors run at unity power or, if so desired, even at leading power factors ranging from 0.90 to 0.60, they should be used, wherever possible, to drive pumps, compressors, and motor-generator sets in plants having lagging power factor loads.

Unity power factor motors are usually less expensive and more efficient than those with leading power factor. However, if fully loaded, they cannot furnish compensation for lagging power factors, therefore, it is sometimes desirable to buy larger motors or those designed for leading power factor in order to use the surplus output for supplying leading reactive correction for low plant power factor.

In direct current generators and motors and in small-size alternating current generators, the magnet or field poles are mounted in the stationary frame or "stator." The armature current is handled by brushes riding on the commutator of d.c. machines or by brushes and slip-rings in the case of a.c. generators.

In larger sizes of a. c. generators and synchronous motors, the conditions are reversed, the field poles being mounted on the rotating member or "rotor". Direct current is introduced into the field windings by means of slip-rings and brushes. The armature coils are mounted in the stator. By this method, large alternating currents are handled without the use of trouble-some moving parts.

In d. c. generators, the poles are magnetized by "shunt" field windings consisting of many turns of wire carrying comparatively little current. The name shunt field is given because the windings are connected across or in parallel with the armature in the case of self-excited machines.

When it is desired to vary generator voltage, a variable resistance or rheostat is connected in series with the shunt field winding. Increase of resistance decreases field current, thereby cutting down the magnetic flux lines and lowering volts generated. **Note:** The voltage generated varies directly

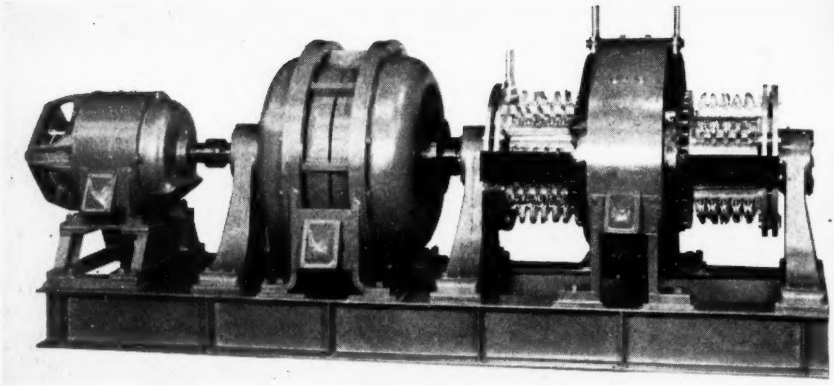

Fig. 54—Plating motor-generator set
(Photo courtesy Columbia Electric Mfg. Co., Cleveland, Ohio)

with number of armature conductors, speed of rotation and number of flux lines per pole.

The voltage regulation of a shunt-wound generator is poor, which means that as the load is applied, the voltage drops. To counteract this, there is added to the field poles a series winding, so called because it is in series with the load current or a shunted portion of it. Thus, as the load increases, the field is strengthened and the voltage maintained at its normal value.

Such a generator is called "compound-wound" because it has both shunt and series fields. If the windings are so designed that the voltage remains constant at full load, it is called "flat-compounded"; if designed to give higher than normal volts at full load, it is called "over-compounded."

Direct current generators are said to be "self-excited" when their field currents are furnished from their own armatures. This is possible because, after their poles are once magnetized, there is always "residual magnetism" in the pole pieces. As soon as the generator begins to turn, this residual flux induces a few volts in the armature which sends a small current through the field. This results in a build-up to normal voltage in a few seconds.

Plating generators are usually "separately excited", receiving their

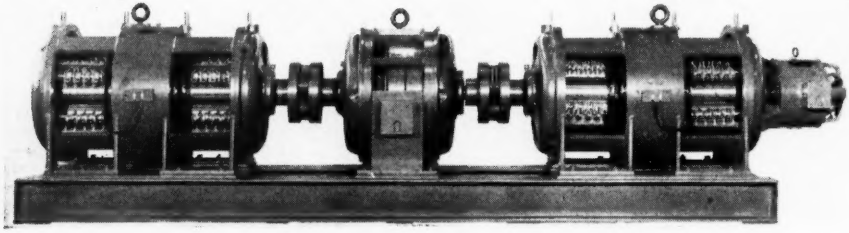

Fig. 55—Three-unit motor-generator set
(Photo courtesy The Electric Products Co., Cleveland, Ohio)

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field current from a separate d. c. power source. This arrangement affords better voltage control where it is desired to vary generator line volts through a rather wide range.

As a consequence, an ideal plating motor-generator set consists of a synchronous driving motor, a d. c. generator to supply plating current, and a

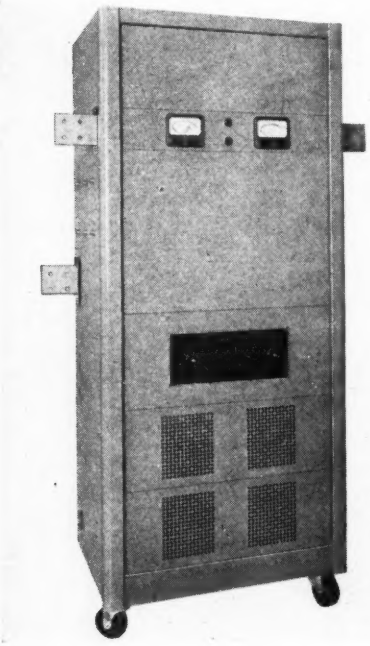

Fig. 56—Selenium rectifier unit
(Photo courtesy The W. Green Electric Co., Inc., New York, N. Y.)

small d. c generator called an "exciter", which furnishes the field current not only for the plating generator, but also for the synchronous motor. Figure 52 shows such a set. The units left to right are: 100 h.p., 440-volt, 3-phase, 60-cycle, 450 r.p.m. synchronous motor having 80 per cent leading power factor; 12-volt, 5,000-ampere, d. c. generator; and exciter.

Space does not permit a discussion of the subject of commutation. Suffice it to say that in order to reduce sparking at the brushes of d. c. generators and motors, another set of pole pieces is mounted between the main field poles. These are called "interpoles" or "commutating poles" and carry series windings through which the load current or a shunted portion of it flows.

Figure 53 provides an exploded view of the Electric Products d. c. generator. The frame section shows the main poles carrying the shunt and series windings and also the interpoles.

Plating generators are often built with double commutators, the two halves of the armature winding being electrically independent of each other. This permits a series or parallel connection. Such a set is shown in Fig. 54. It consists of direct coupled exciter, 600 r.p.m. synchronous motor drive, and generator which can be used at 6 volts, 5,000 amperes or 12 volts, 2,500 amperes.

Figure 55 shows an Electric Products motor-generator set consisting of a single driving motor for two double-commutator, d. c. generators. This makes a very flexible combination, since each generator can be connected to deliver 2,500 or 1,250 amperes at 6 or 12 volts respectively.

Another power source for electroplating which has come into prominence in comparatively recent years is the rectifier. In its broadest sense, any device which permits the flow of current in one direction, but not in the opposite direction, is a rectifier. The commutator on a d. c. generator is a rectifier which, by proper timing, mechanically inverts each half-cycle reversal of the a.c. wave.

As opposed to mechanical rectifiers, such as the commutator, there is a type known as "electronic." These divide themselves into two general classes: (1) those employing vacuum

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Many new subjects will be discussed, including Strip Plating, Organic Finishes, and Activities of the Research Committee. The latter will include: tank linings, corrosion resistant equipment, rack coatings and similar materials.

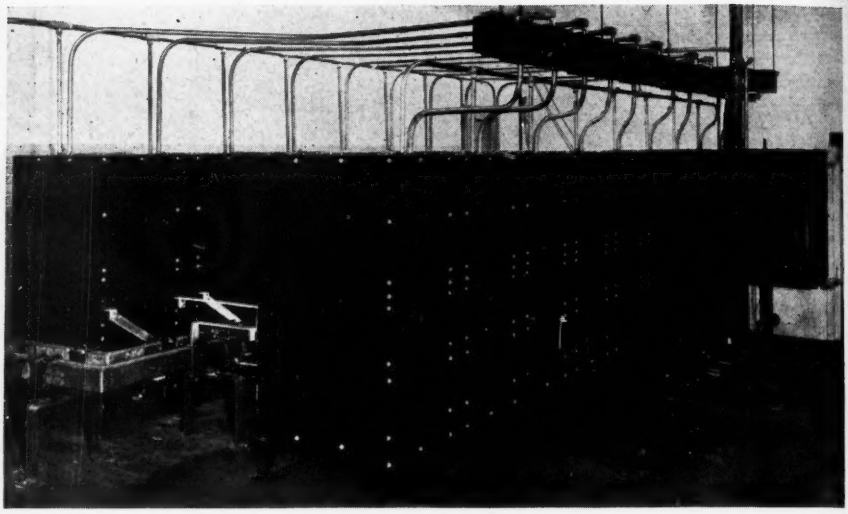


Fig. 57—Rectifier installation for anodizing
(Photo courtesy Lasalco, Inc., St. Louis, Mo.)

tubes or gas-filled tubes and (2) those known as plate or "junction" types. It is the latter type which will be discussed in connection with its application to electroplating. These rectifiers have no moving parts, except for the fans used to ventilate them. Their rectifying ability depends upon the one-way conductivity of certain chemical compounds and metals.

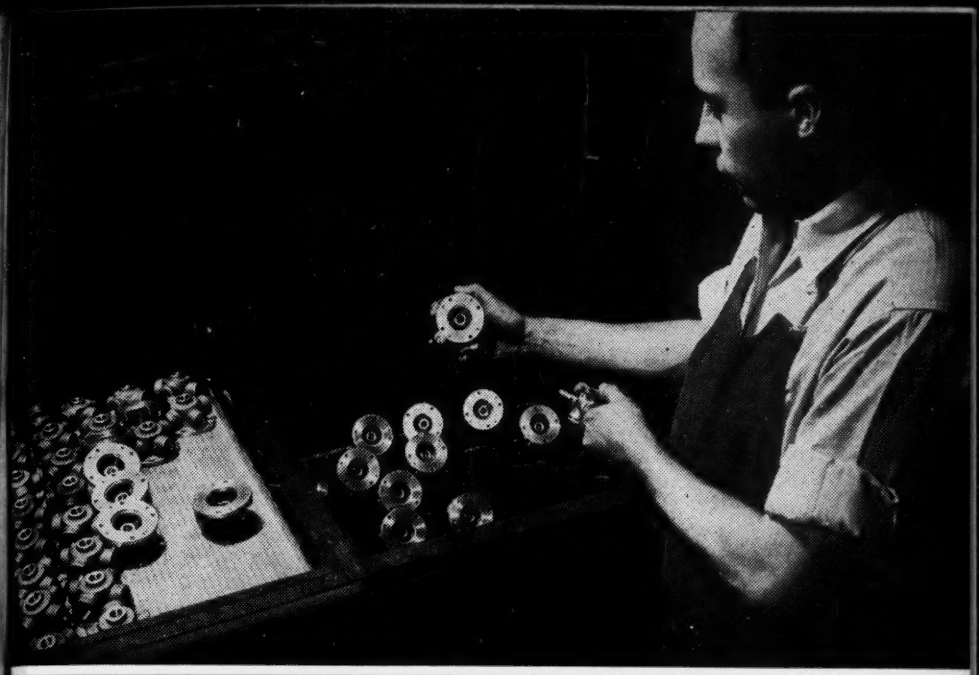
The ideal rectifier would have zero resistance in one direction and infinite resistance in the opposite. Such conditions are fulfilled in the tube rectifiers mentioned above in class (1), but metallic junction rectifiers have these characteristics to an extent sufficient for use in electroplating and anodizing processes. This property is sometimes called "valve action" and is a result of the fact that electrons move easily from some certain material to another, but hardly at all in the opposite direction. Since flow of electrons is really flow of electric current, it follows that electronic rectifiers function by permitting only one-half of the a. c. wave to pass. Whereas the commutator reverses the negative loops of the a. c. waves, the electronic rectifier simply cuts them off.

Single phase full-wave rectification provides a pulsating voltage very similar to that of a two-bar commutator. By using three phase full-wave rectification, the pulsations have an amplitude about equivalent to that obtained with a six-bar commutator.

Rectifiers are assemblies of flat plates or discs of metal in contact with metallic oxide or sulfide surfaces or a film of metal such as selenium. Three general classes of junction type units are in use:

1. Copper oxide
2. Magnesium-copper sulfide
3. Selenium

1. The copper oxide unit consists of a copper disc with a layer of red cuprous oxide on its surface assembled with great pressure against a contact washer of soft metal such as lead.



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Current flows from the oxide film to the copper disc.

2. The magnesium-copper sulfide unit is built up with high-pressure contact between discs of magnesium metal and of copper sulfide. Current flows from copper sulfide to magnesium.

3. The selenium unit consists of discs of steel or aluminum coated with selenium metal which, in turn, is coated with a low-resistance alloy. Each plate is a rectifier, current passing from selenium to front electrode.

Figure 56 shows a typical Selectro-Plater unit complete with voltage controls, meters, pilot lamp, overload warning and automatic cut-off devices. It is selenium rectifier rated at 6 volts, 3,000 amperes.

Plate rectifiers of the types discussed operate at from 0.92 to nearly unity power factor. Varying according to type and to method of electrical hookup, their overall efficiencies range from 50 to 85 per cent and voltage regulation (ratio of full-load voltage drop to no-load voltage) from 10 to 25 per cent.

Transformers operating from 220 or 440-volt, 60-cycle, three-phase lines are usually employed to furnish a. c. to the rectifiers. They step the voltage down to a low value approximately equal to that to be delivered from the d. c. side of the unit.

Operating temperature conditions vary with different types of rectifiers. The copper oxide units are operated at about 10 deg. C. (18 deg. F.) temperature rise at rated load, assuming ambient temperature of 35 deg. C., or at a total average temperature of about 45 deg. C. (113 deg. F.). Magnesium - copper sulfide units operate at around 85 deg. C. (186 deg. F.) for maximum life. Selenium units are run at not over 75 to 85 deg. C. (167 to 185 deg. F.) for best performance.

In order to aid in keeping the transformers and rectifying units cool, it is cus-

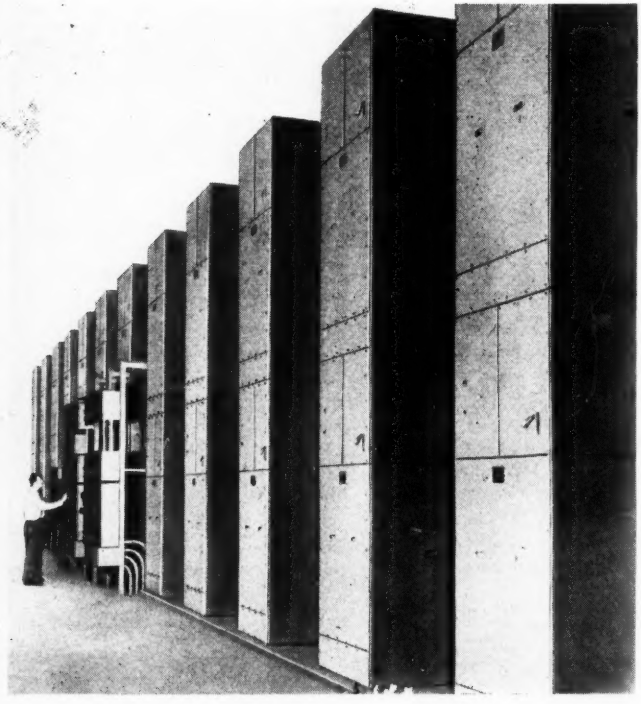
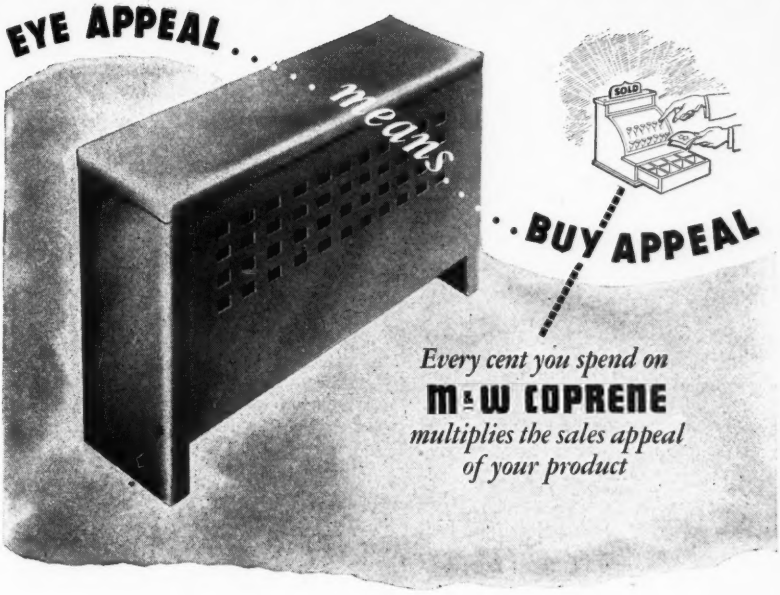


Fig. 58—Rectifier installation for tin plating
(Photo courtesy Hanson-Van Winkle-Munning Co., Matawan, N. J.)



M & W Coprene air-drying enamels increase the sales appeal of such products as metal or wood cabinets, furniture, air-conditioning equipment, and many other special products where a handsome, high-gloss, chemical-resistant finish is desired. They protect and prolong the life of such products because of their excellent adhesion to steel and great resistance to weather and most chemicals.

Coprene can be supplied in plain air-drying enamels, synthetic metallic enamels that air-dry to a lustrous metallic finish, or in air-drying Hammertone finishes. Coprene air-dries dust-free in a few minutes and hard overnight, but can be force-dried. Available in standard colors in: plain enamels, synthetic metallic enamels or Hammertone finishes.

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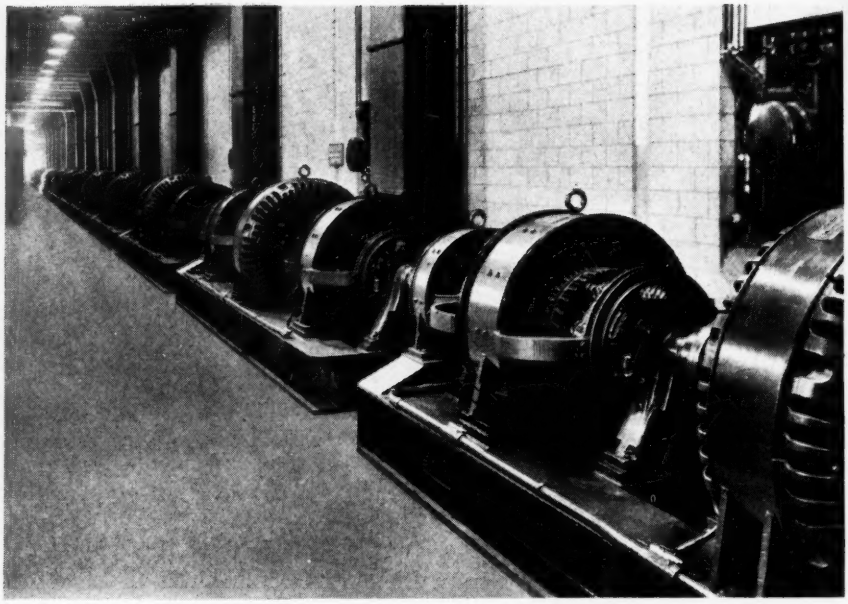

Fig. 59—Motor-generator installation for chrome plating
(Photo courtesy Hanson-Van Winkle-Munning Co., Matawan, N. J.)

tomary to furnish fan ventilation, especially in the larger units. Air for ventilation should never be warmer then 95 deg. F. and where feasible, it is desirable to induct cool, clean air from outside the plating room.

Since rectifiers are usually built in basic units of 6 volts, by means of series and parallel connections, banks of units can be grouped somewhat like building blocks to obtain any desired combination of voltage and current for plating or anodizing operations.

The standard voltages for plating are fairly well covered by the range of 6, 12, and possibly 18 volts. Anodizing operations range from about 24 volts for sulfuric acid up to not over 48 volts for chromic acid and chromate processes.

For example, one, two or three 6-volt, 2-000 ampere units in series would give 2,000 amperes capacity at 6, 12, or 18 volts respectively. Eighteen such units arranged 6 in series and 3 groups in parallel would give 6,000 amperes at 36 volts.

Figure 57 shows a bank of 18 General Electric copper-oxide rectifier units used for chromic acid anodizing. The set was rated at 40 volts, 5,000 amperes. These were GE-2,000 units rated at 6 volts, 2,000 amperes, but could be interconnected to give 250 amperes at 48 volts. Running at 40 volts, the current rating could be increased to 48/40 of 250 amperes or 300 amperes, thus giving by parallel connection 40 volts and 5,000 amperes ($18 \times 300 = 5{,}400$).

Figure 58 shows 24 of the 48 units delivering 120,000 amperes at 12 volts for tin-plating sheet in one of the large steel mills. Each unit is rated at 12 volts, 2,500 amperes.

Since this article is simply an expo-

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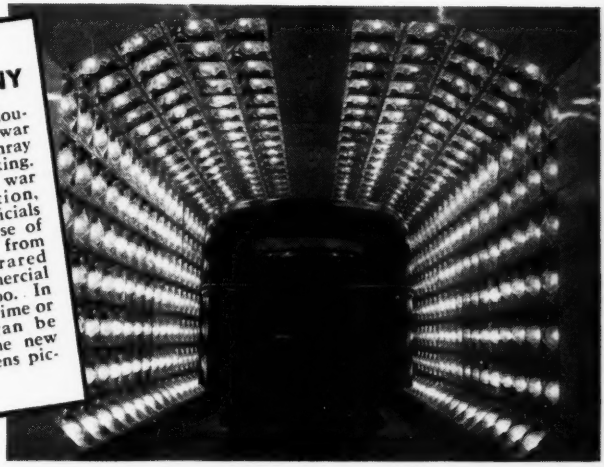
White Motor saved thousands of hours during the war by using Fostoria Evenray equipment for paint baking. In swinging over from war to peacetime production, White production officials have extended their use of Infrared. They knew from experience that Infrared would speed up commercial truck production, too. In only 20 minutes, a prime or final finish coat can be baked in one of the new Fostoria Evenray ovens pictured here.



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sition of the subject of power supply for plating, no discussion of the relative merits of motor-generators and rectifiers would be appropriate. Each type of supply has its advantages and each its disadvantages; both have their proper applications in the plating and anodizing industry.

In the author's opinion, the ideal layout for any plating room would call for a separate power source, be it motor-generator or rectifier, for each plating tank. In the case of the rectifier, voltage control may be obtained in small increments of d. c. volts by means of regulators supplied by the makers. Where motor-generators are used, all the necessary control is effected simply by means of a rheostat in the generator field.

Figure 59 illustrates the individual type of supply layout. It shows a group of 15 Hanson-Van Winkle-Munning motor-generators installed in a large Eastern plant extensively engaged in chromium plating. Each motor-generator set is rated at 8,000 amperes, 12 volts; that is, 4,000 amperes each for the two generators driven by the one synchronous motor. Each generator is connected to a chromium plating tank.

(Conclusion)

"Dustkop" Dust Collectors. Individual type "Dustkop" Dust Collectors suitable for collecting dust, dirt, and lint resulting from dry grinding, buffing, polishing, and other operations are described in an eight-page bulletin now available from the Aget-Detroit Co., 602 First National Bank Bldg., Ann Arbor, Mich. Specifications of models, together with ratings as well as prices of units and accessory equipment, are provided in addition to illustrations of typical installations. Also treated in the bulletin is a vapor collector, designed to collect vapors resulting from screw machine and similar machining operations involving coolants. Copy of Bulletin A-350 free upon request.

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Use Iridite as a final protective finish . . . as a paint base for permanent adhesion . . . in combination with zinc plate to replace costlier materials. Iridite *unites chemically* with the metal . . . won't flake, chip or peel . . . won't alter dimensions. Available in bronze, olive drab, black and transparent Iridite Bright. Send today for your Free Test Panel, half coated with Iridite, half unprotected. Test it in your lab. *See* the difference! Write to: Rheem Research Products, Inc., 506 Chemical Bldg., 4004 Monument Street, Baltimore 5, Maryland.

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Finishing Clinic

Accelerated Testing of Organic Coatings

IN these days when new finishing materials and modifications of older materials with new resins or improved manufacturing processes are being introduced so rapidly to the finishing industry, the production man should realize the value of comparatively quick methods for the testing and evaluation of organic coatings. The accelerated testing of organic coatings has become increasingly important as the users of these coatings better recognize the functions and possibilities of the finishing materials.

The accelerated testing of organic coatings, in general, consists of an evaluation of the finishing material for its appearance, application properties, economy, and durability or useful life on the product. Accelerated tests should be made on a comparative basis by using a finish of known field performance as a control to enable proper interpretation of the results obtained on new materials. In the preparation of test panels care should be taken to see that they are properly cleaned and that the organic finishing material is applied in a manner to simulate production conditions under which the finish will be used and to a film thickness in agreement with that to be used on the product.

The material in the container should be examined for settling, separation of tinting colors, and the ease with which it is stirred to a uniform consistency. The applied finish is examined for gloss, color, smoothness of film, depth, evidence for hiding, and ability to obscure minor substrata surface irregularities. When the finish can be compared to a control

product, visual inspection under a variety of light conditions is usually satisfactory.

Moisture Resistance. The exposure to 100 per cent relative humidity at 100 deg. F. or immersion in water at 100 deg. F. is made use of for determining the moisture resistance of organic finishes. The panels should be examined at the end of 48, 96, 240, 500, and 1,000 hours for blister formation, under film corrosion, adherence, softening, and checking or cracking of the finish. For example, a finish which stands up for 1,000 hours is generally considered satisfactory from the standpoint of moisture resistance for use on refrigerators. The moisture resistance requirements of finishes for other appliances are somewhat lower than for refrigerators.

Salt Spray Test. The salt spray test is commonly used for organic finish testing and consists of atomizing a 20 per cent salt solution, allowing the salt fog to pass over the test samples. The method described in A. S. T. M. Specification B-117-44T is most widely used. The test should be used with discretion and is generally believed to be most valuable for comparing the efficiency of phosphate and other coatings under organic finishes.

Grease Resistance Tests. Unsalted butter, bacon grease, lard, and mixtures of any of these containing 10, 25, and 50 per cent oleic acid are smeared as a thin film on different areas of the test panels. The panels are then placed in an oven at 100 deg. F. in a horizontal position. They are removed from the oven, allowed to cool to room temperature, and examined for attack at the end of 48, 96, and 240 hours of oven treatment. The finish, particularly for a line of household appliances, should show no evidence of cracking or discoloration.

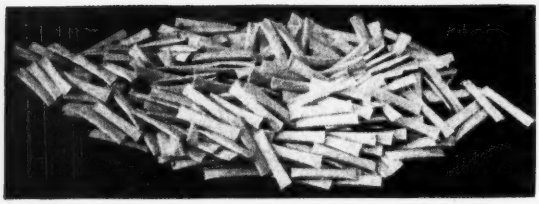
Stain Resistance Tests. The panels are placed in a horizontal position and about 1 ml. of strong coffee, strong tea, various vegetable and fruit juices is placed on the finishes. To prevent evaporation of water, a watch glass approximately 2 inches in diameter is placed over the liquids. After 48 hours of exposure at room temperature, the watch glass is removed, the surface washed with water and polished with a mild non-scratching polish. The finishes are then rated for their stain resistance.

Color Retention Tests. There is no one test which reveals complete information, however, the initial color change, or commonly called bleach after baking, can be checked by masking a portion of the panel and exposing for two hours to bright sunlight. After exposure, the finish should be placed in a dark room free to air circulation for 24 hours and examined for the degree it has returned to the original color.

Alkali Resistance Tests. Test panels are immersed in a solution containing one ounce per gallon of trisodium phosphate maintained at 170-180 deg. F. for 24 and 48 hours. Finishes which show no more than slight attack after the above exposure have afforded satisfactory alkali resistance on home laundry equipment.

Flexibility and Chip Resistance. The flexibility and chip resistance of organic finishes usually can be evaluated from the results of impact, bend, and knife tests.

Mar and Wear Resistance. The mar resistance is evaluated by the degree of marring caused by rubbing the back edge of a knife blade back and forth across the finish. The wear resistance is determined by a motorized device which moves an abrading article, such as the ground edge of a thick glass specimen jar, back and forth across the finish surface. The number of cycles required to wear through or the amount of wear produced compared to



Polystryrene chips
(Photo Courtesy The Udylite Corp., Detroit, Mich.)

the effect of an equal number of cycles on the control finish is used to evaluate the wear resistance ("The Enamelist," Feb. 1946).

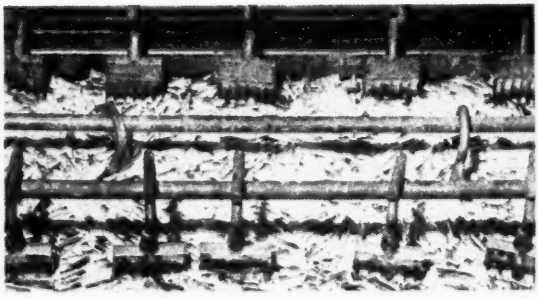
These high-spot accelerated tests should prove of value to the production man in the preliminary evaluation of new organic coating materials.

* * *

Reducing Losses in Chromium Plating Baths

CHROMIUM plating has found extensive use as a final finishing operation on many articles in general use where it is electrodeposited as a thin coating to serve as a non-tarnishing, durable surface finish for decorative purposes. For many years, metal platers have had to take into account, when figuring their costs, a sizable loss of chromic acid in the plating bath. This spray loss occurs because the plating action causes hydrogen and oxygen bubbles to be formed. These bubbles being lighter than air, first flow to the surface of the bath and then blow off into the air.

Of interest to the production man is the recent announcement ("Modern Plastics," Jan. 1946) that by covering the surface of a chromium plating bath with polystyrene chips, the oxygen and hydrogen bubbles are broken before leaving the surface and the loss of chromic acid is reduced by 64 per cent. The polystyrene rods are formed from extruded tubing pinched at 2-inch intervals. Floats are preferred to chips or rods as a covering agent because of their buoyancy and because they do not stick to the plated articles, thereby badly clogging the drains. These floats are now being supplied commercially to the plating industry and are used in the quantity of about 2 lb. per square foot of solution surface.



Surface of chromium plating bath covered with polystyrene chips
(Photo Courtesy The Udylite Corp., Detroit, Mich.)

* * *

A New Protective Finish for Magnesium Alloys

MAGNESIUM alloys generally require a protective finish, the choice of which is determined largely by service requirements. A new method of producing relatively heavy protective coatings on magnesium alloy by electrochemical treatment has been described by R. B. Mason of the Aluminum Research Laboratories ("The Iron Age," Mar. 21, 1946). The treatment, which has been designated

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TRY MAGNUS 92K

This new concentrated alkaline cleaner in liquid form has shown very interesting results wherever it has been used on soft metals of any kind. It is safe, speedy and thorough, with excellent rinsing qualities. It has been particularly valuable in the cathodic electrocleaning of zinc and aluminum.

Magnus 92K can be used in spray type cleaning machines as well as in still tanks, since it is non-foaming. Solutions do not emit unpleasant fumes or odors.

If you have been having any troubles in cleaning soft metals, it will pay you to give Magnus 92K a thorough trial.

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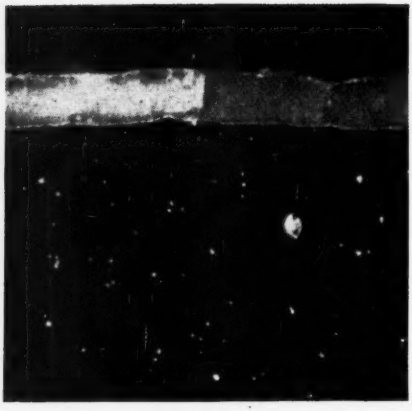


Cross-sectional view of electrolytic oxide coating formed on magnesium, showing appearance, thickness, and uniformity obtained (500X)

AMC treatment R, was developed for the American Magnesium Corporation and is reported to have been used in the Aluminum Research Laboratory for a number of years for the protection of magnesium alloys and as a base for paint coatings. This finish is produced by anodic oxidation of the magnesium in a sodium hydroxide electrolyte, followed by sealing in a chromate solution.

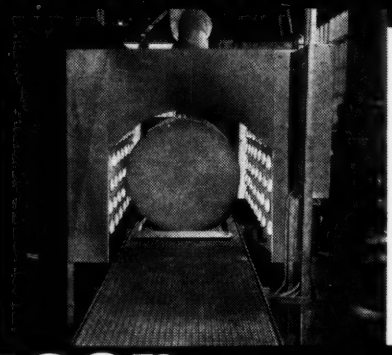
The coatings which are formed on magnesium alloys by certain electrolytic treatments are thicker and considerably more resistant to abrasion than coatings that are formed by simple chemical treatment. The resistance of these oxide coatings to corrosion can be improved appreciably by the use of a final sealing treatment. For magnesium, therefore, coatings of this character are of considerable advantage where resistance to both abrasion and corrosion is essential.

In the anodic treatment of magnesium alloys, the condition of the surface of the article being treated is of much importance and has considerable

HUMIDITY PROBLEM SOLVED FOR FINISHING MEN

Before installation of this Jensen "dual-heat" infra-red oven at Columbus Heating and Ventilating Company, humid weather slowed down finishing production on storage-tanks-with-skids virtually to a stand-still. Paint took from 5 to 6 days to dry. Now, with Jensen "dual-heat", the company finishes 10 TANKS PER HOUR *regardless of the weather!* This specially engineered Jensen oven uses only 160 lamps, with two rows underneath the conveyor belt to reach the extreme bottom of the tanks.

Write Jensen about *your* finishing problems *today!*



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Plated plastic bracelets

influence on the voltage requirements and the characteristics of the resulting coating. The throwing power of the sodium hydroxide electrolyte is much less than that of the sulfuric acid electrolyte used for the Alumilite treatment of aluminum alloys. Consequently, it is essential to have the surface of the magnesium alloy as clean as possible. Special cleaning procedures are necessary to accomplish this.

Ordinarily, most of the grease can be removed by treatment in a nearly boiling 5 to 10 per cent sodium hydroxide solution or in a solution containing sodium carbonate and trisodium phosphate. Following degreasing, an additional treatment of some type should be used to remove heavy oxide films. This is usually accomplished by immersion in a chromic acid solution. If the oxide coating is to be subsequently dyed, however, a 2-minute etching treatment in a 20 per cent ammonium chloride solution at room temperature may be used instead of the chromic acid solution. For magnesium castings that have not been machined, it may be necessary to use a nitric acid-sulfuric acid solution to remove some of the surface skin rapidly before using either the chromic acid solution or the ammonium chloride etch.

The magnesium articles after being thoroughly cleaned are connected as an anode in an electrolyte containing 5 per cent sodium hydroxide and treated for a period of 30 minutes with a current density of 12 to 18 amperes per square foot. Ordinarily, a potential of 4 to 5 volts will be satisfactory when the temperature of the electrolyte is between 140 and 160 deg. F.

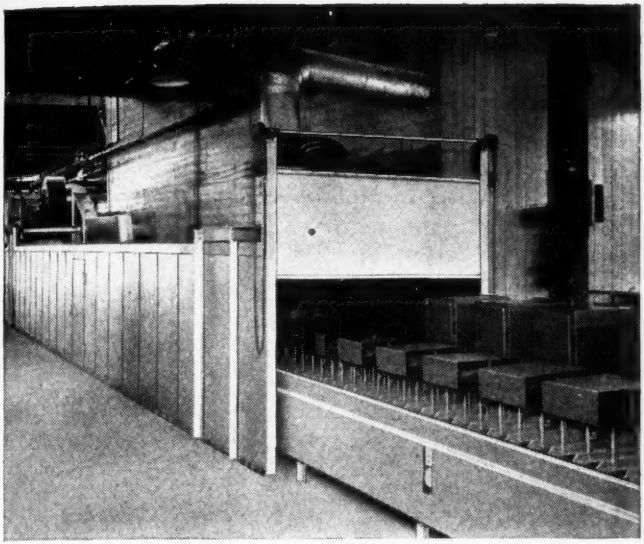
Good electrical contact is essential for consistent results. The use of high current densities will give rise to difficulties from poor contact. After the electrolytic treatment, the coated article should be washed thoroughly in water and then sealed for 30 minutes in a sodium chromate solution which is maintained at a temperature of 170 to 180 deg. F. Following the sealing treatment, the oxide coatings have a slightly yellowish color and are relatively smooth and hard. These coatings provide good protection against abrasive and corrosive action and serve satisfactory as a base for painting.

The anodic coatings produced on magnesium differ from those produced on aluminum in that boiling them in water does not seal the coating or prevent the absorption of organic dyes. The anodic coating produced on magnesium can be colored with any of the organic dyes that are used for coloring oxide coatings on aluminum. These colored coatings can be employed to advantage on any article of magnesium which is not subjected to corrosive conditions. The dyed magnesium oxide coatings, however, are not very resistant to fading under outdoor conditions.

* * *

Dross Formation in Hot-Dip Galvanizing Operations

THE formation of dross in hot-dip galvanizing operations is a prob-



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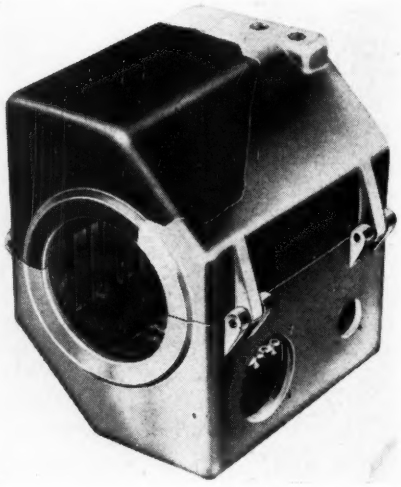
lem of considerable interest to finishing departments employing this hot-dipping process for coating metal products. There is considerable loss of time spent in drossing the pot, as well as loss in revenue due to the difference in price of zinc and dross.

Factors which contribute to dross formation in production units ("Sheet Metal Industries," Mar. 1946) may be: (1) the presence of free iron salts from the pickling and wash tanks; (2) loose scale improperly washed off in the above operations; (3) iron salts formed during fluxing and drying; (4) corrosion of the pot; (5) corrosion of tools and hooks used in the pot, and from articles accidentally dropped in the pot and left there; and (6) formation of dross from the work itself. In considering these various factors, it should be remembered that in the average plant 3 lb. of iron introduced into the galvanizing bath will produce about 100 lb. of objectional dross.



Molded plastic housing shielded with copper and cadmium plate applied by Metaplast Process

Cleaning the surface of the material before zinc coating is an essential operation since the quality of the coating is markedly influenced by the character of this surface and its freedom from extraneous substances. There are two steps in the process of surface preparation following degreasin. The first consists of a pickling treatment in acid in which the oxide scale and inert material are removed from the metal; the second is a fluxing treatment. The formation of dross may be considerably influenced by these surface pretreatments due to the presence of free iron salts on the articles or remaining loose scale. The amount of retained iron may increase rapidly with increasing roughness of surface and with the quantity of iron in the pickle solution. Thorough water rinsing is essential to minimum dross formation, so far as related to pickling procedures.

* * *

Plastics Can Be Plated

THE finishing engineer should keep in mind the fact that practical methods are available today for large scale electroplating of plastics whereby it is possible to plate the entire surface or part of the surface of a non-conductive plastic object of any shape with smooth, adherent, relatively non-porous metal coatings of the desired thickness.

What are the valuable properties that metal electroplates give to plastics that the plastic would not have otherwise? On the practical side, the finished object has acquired, by virtue of the plating operation, a proportion of the physical characteristics of a metal product yet retaining the lightweight of plastics and the economics of forming into complicated shapes. From the decorative point of view, plated plastics combine the brilliant color which can be achieved only with

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140	Hard Chrome	Bright Yellow	Exceptionally brilliant color. Ideal for use in hard-to-see recesses.
150	Copper & Cadmium	Reddish Brown	Ideal for production spraying. Withstands electrolytic cleaning. Quickly removed.
160	Copper Hi Temp.	Green	Only 1 coat needed. Has exceptional adhesion and resistance to high temperatures.
170	Tin and Zinc	Red	Unusually resistant to high-caustic solutions.
180	Silver	Green	Exceptional dielectric strength in all high-cyanide solutions.

Descriptive bulletin gives complete information on all of these lacquers. Write for a copy today—and for name of supplier near you.

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synthetic resins with the gleam of metal, giving promise of products with the utmost eye appeal.

The undesirable properties of plastics, such as absorption of oils, solvents, and moisture, is largely eliminated by the proper electroplated coating. Swelling or distortion of the base organic material is thus prevented. Plating increases the heat and impact resistance; the dimensional stability and rigidity of the plastic part is increased due to the skin effect of the high tensile strength plated metal film. The corrosion resistance of a metal coating deposited directly onto a plastic base has been found to be superior to that of an equivalent finish on metal. Electrolytic action between dissimilar metals is nonexistent, and the corrosion and spotting out which formerly occurred with a metal base is eliminated.

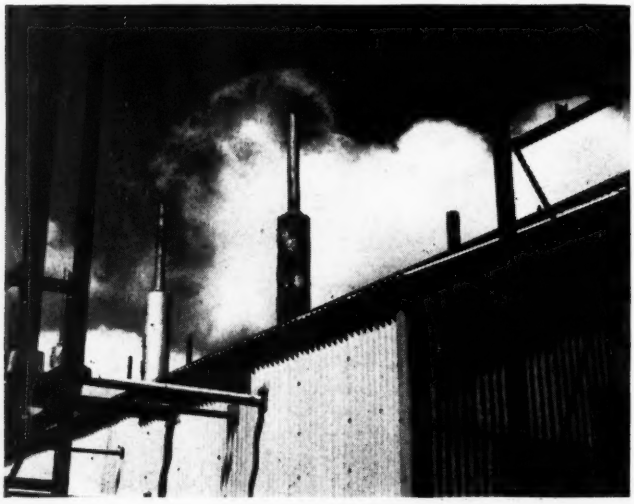
In production, the plating of plastics may allow a manufacturer to use certain plastic materials in a particular product which ordinarily could not be utilized. For example, mixed plastic scrap of one certain type but of a plurality of colors can be molded into the desired shape and then plated, thus making use of idle scrap.

Although a wide variety of methods have been reported for the coating of plastics with metals, metallizing by chemical reduction to produce a conductive coat for subsequent electroplating is the most widely used present-day method. A patented method involving the production of a silver film by chemical reduction, known as the Metaplast Process, is now being used to a great extent. The electroplating process itself follows standard practice with minor variations.

* * *

Heat Resistant Paints

TO meet the need for durable protective coatings on all kinds of equipment and surfaces exposed to elevated temperatures and high humidities, silicone resins have been developed for use in formulating heat resistant vehicles for enamels or paints. The silicones are new compounds based on the chemistry of oxygen-silicone linkages, and are hailed as an outstanding achievement in a non-metallic engineering material. The compounds are now being produced



The badly rusted muffler at the center of this illustration was painted with conventional aluminum paint on the same day that the muffler next to it was coated with Dow Corning silicone resin pigmented with aluminum powder. Both mufflers are subjected to operating temperatures of approximately 510 deg. F.

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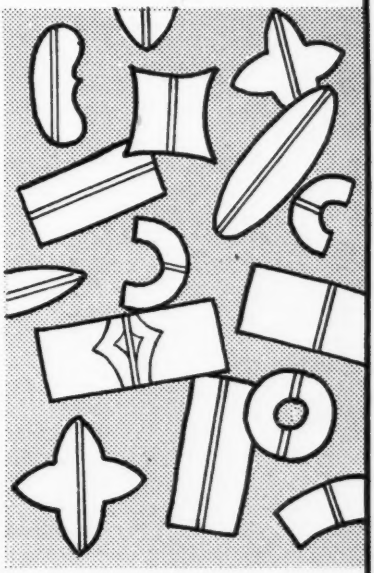

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TABLE I

Drying Characteristics of Dow Corning Silicone Resins 801 and 803 (Pigmented with 2 lb. Standard No. 205 Aluminum Paste per gallon of 60 per cent silicone resin solution)

Drying Conditions	Character of Resin Film	
	DC801	DC803
Air drying 16 hr.	Tacky	Tack-free
After baking		
1 hr. at 70° C.	Tacky	Tack-free
1 hr. at 140° C.	Soft, slight tack	Medium hard, tack-free
4 hr. at 140° C.	Soft, tack-free	Hard, tack-free
16 hr. at 250° C.	Very hard, flexible	Very hard, brittle

by the Dow Corning Corporation and the General Electric Company. Two of these resins for heat resistant vehicles are designated as DC 801 and DC 803. Typical uses are as heat resistant paints for exhaust stacks, flues, hot-air ducts, and ovens.

Special care must be exercised in the selection of pigments for silicone enamels because of the poor thermal stability of many pigments. The following pigments have been tested for stability at 200-250 deg. C. and are recommended by Dow Corning for use in silicone enamels.

Carbon Black
Cadmium Sulfide
Metallic Aluminum
Monastral Blue
Monastral Green
Titanium Dioxide
Red Iron Oxides
Magnesium Silicate
Diatomaceous Earths
Talc

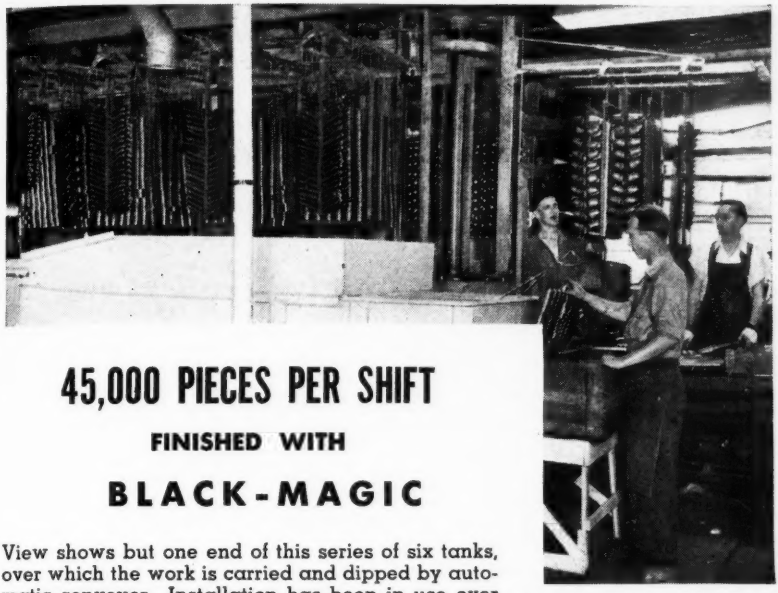
The drying characteristics of the silicone resins used in vehicles for protective coatings are shown in Table I above prepared by the Dow Corning Corporation.

Ideal Dust Collector for installation on grinders, buffers, sanders, polishers, lathes, and other machines in removing abrasive dust, metal particles, fine chips, flakes, and other dirt is featured in a four-page illustrated folder published by Ideal Industries, Inc., 1031 Park Ave., Sycamore, Ill. Copy free upon request.

"Paint Progress." The use of a new type of zinc dust-zinc oxide metal protective paint in the coating of the interiors of drinking water tanks aboard ships is the subject of an article appearing in Vol. 6 No. 1 of "Paint Progress," publication of The New Jersey Zinc Co., 160 Front St., New York 7, N. Y. The booklet also contains other interesting illustrated stories on paints, including luminescent coatings. An electrochemical method for determining initial failure of metal protective paint systems is also discussed in the booklet, copy of which is available free upon request.

"Industrial Research Progress at Armour Research Foundation of Illinois Institute of Technology, 1944-45." Published by the Armour Research Foundation, Technology Center, Chicago 16, Ill., a non-profit institution established in 1936 to render a research and experimental engineering service to industry, this 20-page pamphlet describes the foundation's facilities and activities in chemical reseach, as well as those in the other major fields of metallurgy, engineering, physics, and so on. Copy free upon request.

Cleaning Zinc Die Castings. The May issue of "Silicate P's & Q's," house organ of the Philadelphia Quartz Co., 121 S. Third St., Philadelphia 6, Pa., briefly reviews tests recently made on the cleaning of zinc die castings, indicating the effectiveness of metasilicate and sesquisilicate as cleaning materials. Copy free upon request.



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FUTURE *Metal* FINISHES

Aided by the Plastics Industry

By CHARLES DELMAR TOWNSEND
Process Engineer

POSTWAR planners of metal products are now beginning to realize that while they have a new industry to compete with they also have gained an ally. During the war, plastics made rapid strides. These materials are making inroads into the metal industry, and the manufacturers and designers of metal products now have an opportunity to improve their products by using these plastics and thereby increase the saleability of their merchandise.

Prior to the war, plastic coatings to enhance the metal finishes were used only sparsely. However, during the war effort, nearly all of these coatings went into production for the armed forces, and the curtailed manufacture of civilian goods did not permit the use of these new advancements. The use of plastic coatings is now being widely discussed and future products will introduce new surface finishes.

It is well to note that nearly all the organic plastics for coating can be applied by brushing, spraying, dipping, or roll coating. This alone opens up many ways to economically finish a number of products. Nearly all the plastics can be dried by exposure to the air or baked at high temperatures using infra-red or oven baking.

Basically, there are three different classes of coatings, the first of which are lacquers that comprise cellulose derivatives, gums, solvents, and plasticizers. These are perhaps the most important in the industrial finishing of metal products. The second group is the spirit varnishes which are resinous solutions that dry by the evaporation of the solvent.

Oleoresinous varnishes are a blended and heat-treated combination of natural and synthetic resins, solvents, and drying oils which form the varnishes and can either be air-dried or oven-baked, depending upon the solvents and resins used. This third group is also important in the finishing industry and will play an increasingly useful role as the developments made during the war become known.

The urea resin coating which was introduced in this country in 1928 was by 1938 becoming widely used in the metal industry. Its resistance to sunlight and exterior exposure has made this finish popular. The urea under controlled conditions reacts with formaldehyde and forms a resinous material that can be dispersed in an organic solution. Sometimes, alkyd resins are also blended with the urea, thus modifying the coating. Since urea finishes are thermosetting, they may be baked at temperatures ranging from 225 to 325 deg. F. The structure of the coating is such that the film is uniformly hard at the surface and at the bottom where it aheres to the metal. This helps to eliminate internal stresses which occur in normal oxidizing finishes.

Urea coatings have been used for

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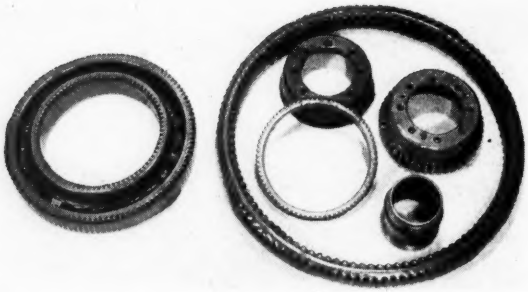

Metal parts which have been coated with Hercules ethyl cellulose Plastic Peel for protection against corrosion as well as marring or scratching during shipment or storage (*Photo courtesy Hercules Powder Co., Inc., Wilmington, Del.*)

refrigerators, kitchenwares, and hospital equipment when the resin has been formulated with cocoanut or castor oil alkyds. Also, when combined with vegetable oils, the coating has been used on such prewar items as washing machines, ironers, and other metalware. Yet, during the war, many new formulations had taken place, and, since this material has now been released, it will be determined that urea resins will play an important role in the finishing industry. A coating that has been developed during recent years is the oil-reactive ester resin. Since it was necessary to produce a material to take the place of the scarce China wood oil, this resin was brought to the foreground. These ester resins are relatively low polymer intermediates and compare favorably with the softer drying oils.

The oil-reactive ester resin cannot be used alone but must be blended with other soft oils and, with heat, it forms a copolymer. By using these blends with varnish resins, the final product is a fast-drying, high-gloss enamel.

During the last few years, ethyl cellulose has become another important material in the finishing of certain products. Ethyl cellulose lacquers, if properly formulated, are said to be equal to nitrocellulose lacquers in weathering characteristics. The coating is designed to withstand extremely low temperatures and has a very low water absorption rate. The solvents used with this type of coating include such items as ketones, ester-alcohols, and hydrocarbons.

Other coatings classified in the plastics industry which will lend a hand to the metal industry instead of entering solely into competition with it are the chlorinated rubber, vinyl resin, alkyd resin, and acrylic resin materials. All of these were used in war production and now bear watching since complete formation on them is now being released.

No designer nor postwar planner of metal parts should forget the plastics industry and the assistance it can give in providing products with new and better finishes and also in the rainbow of colors that plastics themselves have introduced to the trade.

Miccrotex Air-Dry Rack Coating for insulating plating racks and for use in all plating, anodizing, Parkerizing, and Bonderizing cycles is fully discussed in a six-page folder published by the Michigan Chrome and Chemical Co., 6340 E. Jefferson Ave., Detroit 7, Mich. Copy free upon request.

"Karbate" Plate and Bayonet Heat Exchangers for heating or cooling corrosive solutions in all types of tanks or vessels are covered as to details of construction and operation, service recommendations, and so on, in a 12-page catalog section released by the National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y. Drawings and diagrams show typical installations and provide construction details of the various styles in which the heat exchangers are offered. Copy of Catalog Section M-8804 free upon request.

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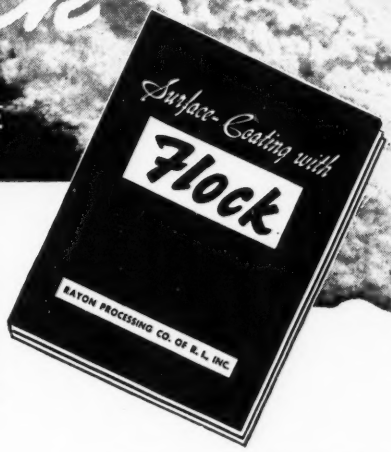

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Rayco Flock consists of particles of rayon, cotton, hair in all colors and in various lengths to produce effects such as suede leather, velvet, velour, mohair, felt, carpet, etc. Can be applied over entire surface, or to selected portion of article. New book: "Surface-Coating with Flock" gives actual swatches and a wealth of data.

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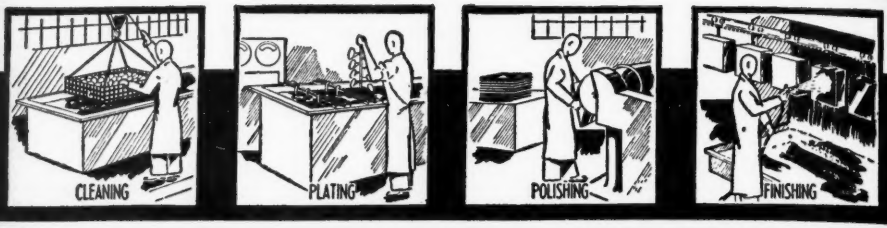
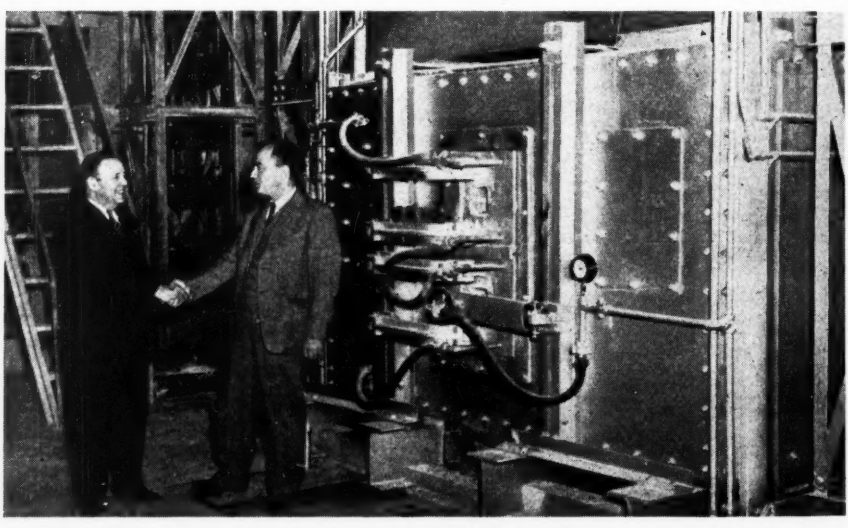


News of the Industry

Pemco Completes Fifth Continuous Smelter

The Pemco Corporation announces the completion of its fifth wholly continuous smelter unit. This new addition, along with the improvements which have been made on the four continuous units now in operation, is expected to increase the capacity of the plant more than 50 per cent, and, it is believed, will mark a long step forward in the production of even better frits and glazes than were possible before the war.

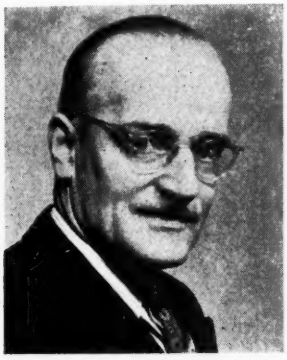
Electronically controlled, the smelter, according to Pemco, produces frit that is never touched by human hands until it reaches the customer. It is further stated by the company that the extraordinary uniformity of the frit produced by this continuous smelting method has been very influential in raising the standards of quality of finished porcelain enamelware throughout the industry.



Richard Turk (right), executive vice president of Pemco Corporation, congratulates H. G. Wolfram (left), vice president and works manager, under whose direct supervision Pemco's fifth wholly continuous smelter was built.

Fidelius Named Assistant Chief Engineer

Walter R. Fidelius has been appointed assistant chief engineer by the Optimus



Walter R. Fidelius

Equipment Co., Matawan, N. J., manufacturer of metal washing and drying equipment. Mr. Fidelius was formerly with the Fitzgibbons Boiler Co., Inc., Oswego, N. Y., where he served as maintenance engineer and also as superintendent of the Tank Hall Department. Prior to that, he was associated with the Williamsburg Power Plant Corp., Brooklyn, N. Y., as test engineer, supervising tests in electric and steam power operation.

A graduate of Cooper Union with a degree of bachelor of science in mechanical engineering, Mr. Fidelius continued further studies on this subject at New York University. In his new post, he will supervise in design, construction, and service.

Dr. Gall Named Assistant Research Supervisor

Dr. W. A. LaLande, Jr., director of Whitemarsh Research Laboratories, Pennsylvania Salt Manufacturing Company, has announced the appointment of Dr. John F. Gall as assistant research supervisor to assist in the coordination of the experimental activities of the Research Division of Pennsalt's Research and Development Department.

Moves District Office

The Buffalo district office of Carbide and Carbon Chemicals Corporation has been moved to the Liberty Bank Building at 424 Main Street, according to an announcement by company officials. Carbide and Carbon Chemicals Corporation, a Unit of Union Carbide and Carbon Corporation, is a producer and supplier of over 200 synthetic organic chemicals, including alcohols, glycols, ethers, esters, ketones, aldehydes, amines, and chlorinated compounds. R. C. Boltz is in charge of the Buffalo district.

Appointed Director of Research

Joseph M. Perrone has been appointed director of research, according to an announcement made by the Watson-Standard Co., Pittsburgh, Pa. For the past 3 years, Mr. Perrone has been doing research and development work on protective coatings at Mellon Institute of Industrial Research. During the war, he was also an instructor in plastics, protective coatings, and organic chemistry for Pennsylvania State College.

Prior to joining the staff at Mellon Institute, Mr. Perrone was associated

Joseph M. Perrone

with Stoner-Mudge, Inc. He is a graduate of Pennsylvania State College where he received his master of science degree, and is a member of the American Chemical Society, Pittsburgh Chemical Society, Pittsburgh Chemist Club, Society of Plastic Engineers, and Paint and Varnish Production Club.

Teague Organization Expands

Because of the growing importance of research and experiment in the designing of industrial products, Walter Dorwin Teague, industrial designer, has leased 5,400 square feet at 245 West 55th Street as an annex to his present quarters at 444 Madison Avenue, New York City. The added space will accommodate a fully equipped model shop, development laboratory, and machine shop, as well as a reception room and a conference room. With much new equipment, it will provide facilities for the most minute precision experimental and testing work, as well as for building full-sized mock-ups required for large-scale projects such as 10-ton trucks.

The Teague organization will continue to occupy three floors at 444 Madison Avenue, with the space formerly occupied there by the development laboratory being converted to additional business offices.

New Egyptian Lacquer Office Building

O. J. S. deBrun, president, The Egyptian Lacquer Manufacturing Company, announces that the new Egyptian Lacquer building in South Kearney, New Jersey, is now occupied by the sales, advertising, and accounting departments of the company. The move was made on April 19. The executive headquarters of the company, however, remain in Rockefeller Center, New York City.

The new Egyptian Lacquer building is a thoroughly modern office structure which has been erected on the company's present factory site at South Kearney. With the occupation of this structure by the sales, advertising, and accounting departments, the company's objective to have these departments in proximity to its chemical laboratories and manufacturing buildings has been attained.

Opens Branch Office in Akron

The Ohio Equipment Co., Inc., Cleveland, has opened a branch office in Akron, Ohio, to better serve its customers in the Akron, Canton, and Massillon territory in connection with their materials handling equipment requirements.

The Akron office will be managed by E. J. Werner, formerly of the engineering staff of The Firestone Tire and Rubber Company, which company Mr. Werner was associated with for more than 20 years.

Recent Additions to Quaker Staff

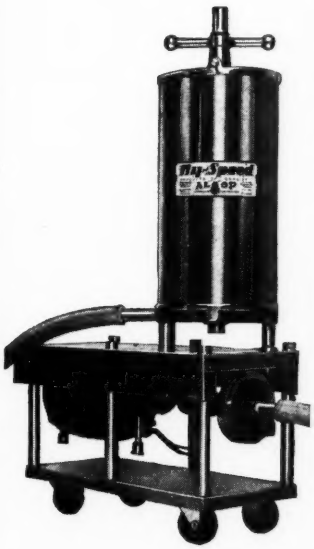
John W. Burley, Jr., a graduate of Pratt Institute, Brooklyn, N. Y., as a bachelor of mechanical engineering and formerly a special technical advisor in the Tools Branch Machine Tool Section of the War Production Board, Washington, D. C., has been appointed to the technical sales force of the Quaker Chemical Products Corporation. Mr. Burley is a veteran of World War II, having served in the Army as a second lieutenant.

Dorian C. Wilkinson, recently released from the Navy, has returned to Quaker where he resumes his old position as a process engineer in the metal field. Since his entry into the service in March 1945, Mr. Wilkinson interviewed dischargees and answered educational problems related to the G. I. Bill of Rights.

Architectural drawing of new Egyptian Lacquer office building

ALSOP "Sealed-Disc" Filters

meet plating room requirements



The Alsop Filter was designed especially to meet the most exacting filter requirements on practically all types of plating installations and that is why thousands of them are doing a perfect job in plating rooms, large and small, all over the world. They do not require filtering powders or slurry mixing tanks.

Check your *Filter Requirement Specification Chart* and note all of the outstanding features of the Filter.

Write us today giving details of solutions to be filtered, there's no obligation, or contact your regular supply dealer.

FILTER REQUIREMENT SPECIFICATIONS

LIQUID TO BE FILTERED	Practically every type of electroplating solution in both continuous and still tank installations.
IMPURITIES TO BE REMOVED	Dust, rust, sludge, all minute particles of suspended matter and sediment which might collect on work and spoil an otherwise perfect finish.
CAPACITY OF FILTER	To be used on our smallest to our largest tanks. Under certain conditions consider using small individual filters for each tank.
FILTER CHARACTERISTIC	Should be portable and easily moved from one tank to another and cleaned with a minimum of labor and time by our most inexperienced help. Motor, pump and bearings must be protected from damage caused by spilled or splashed liquid.
FLOOR SPACE REQUIREMENT	Due to extremely crowded conditions, filter should not require more than a 9" x 20" floor space for a 600 g.p.h capacity. Or other sizes in proportion.
OPERATION REQUIREMENT	Filter must be ready for instant use, also foolproof so that it is impossible to put any plating unit out of commission due to faulty filter operation.
NO LIQUID LOSSES	Filter should be completely sealed - to eliminate dripping or leaking. Due to corrosive action, all valves requiring packing should be eliminated.
TYPE OF FILTER	The new "Sealed-Disc" Filter made by Alsop Engineering Corporation fulfills all of the above requirements and should be given your most careful consideration.

106 KEEN STREET • MILLDALE, CONNECTICUT

ALSOP

ENGINEERING CORPORATION

Filters · Filter Discs & Sheets · Mixers · Agitators

Q. E. Kaysing Joins Swenson

Quentin E. Kaysing has been recently appointed assistant chief engineer of

Quentin E. Kaysing

Swenson Engineering & Manufacturing, Inc., Detroit. Mr. Kaysing has been associated with the Killark Manufacturing Company, St. Louis, for the past 10 years—4 years of that time in the capacity of chief engineer.

In addition to a broad acquaintanceship with the industrial concerns of the middlewest, Mr. Kaysing has enjoyed a membership in the Engineering Club of St. Louis and the St. Louis Electrical Board of Trade.

UC West Coast District Manager

United Chromium, Inc., announces the appointment of Richard J. Wooley as its West Coast district manager. Mr. Wooley will be in charge of Unichrome sales and service for California, Oregon, Washington, and British Columbia and will make his headquarters at 4536 District Blvd., Los Angeles 11, California.

Mr. Wooley is highly qualified by both a technical background and extensive practical experience to render valuable assistance and service to users of Unichrome processes and materials in the western area. He has been connected with United Chromium since January 1944, first as a chemist in its pilot plant and laboratories and then as a service engineer. Previously, he did important work as a plating engineer at the Chrysler Evansville ordnance plant. Mr. Wooley was graduated from Michigan State College in physical chemistry and chemical engineering and was senior instructor in physical chemistry.

Complete stocks of Unichrome materials for product finishing, including plating compounds, rack coatings, stop-off

Richard J. Wooley

lacquers, and organic coatings, will be warehoused in Los Angeles.

QUALITY BRAND

PUMICE

LUMP

Firm . . . Solid . . . Light Weight
Solid Pumice . . . . . All Sizes

POWDERED

All Grades Refined . . Packed in Bags or Barrels
Mine at Bishop, Calif. . Refinery at Beverly, Mass.

Producers of **STIK PUMICE**

Quality Pumice

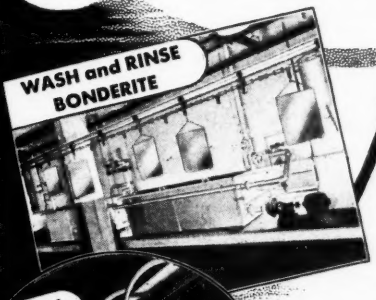
WILLIAM R. ROGERS

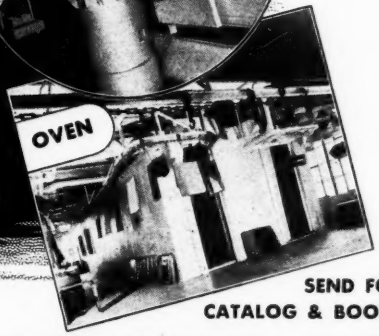
70-80 PARK ST. BEVERLY, MASS.

Quality Pumice

HYDRO-WHIRL

COMPLETE FINISHING SYSTEMS





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We are proud of our capacity for handling the "hard-to-do."

Our experience as specialists is at your service!

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PETERS-DALTON *Incorporated*

17908 RYAN ROAD • DETROIT 12, MICHIGAN

HYDRO-WHIRL DUST COLLECTORS AND SPRAY BOOTHS—INDUSTRIAL OVENS, WASHERS AND VENTILATING SYSTEMS

Rust-Oleum Appointments

R. A. Ferguson, president of the Rust-Oleum Corporation, manufacturer of Rust-Oleum rust preventive, announces the appointment of two new agents.

E. W. Kush, 769 St. Paul St., Denver, has been assigned to the railway supply field for Colorado, and R. B. Parrish, 1201 4th St., Jackson, has been appointed industrial representative in the Michigan territory.

Siddall Joins Pennsalt Subsidiary

Leonard T. Beale, president of Pennsylvania Salt Manufacturing Company, announces the appointment of Cameron Siddall as acting manager of Cotton Poisons, Inc., Bryan, Tex., a Pennsalt subsidiary.

Mr. Siddall, who served in the Army Sanitary Corps for more than 3 years, formerly was with the Stauffer Chemical Company of Texas and the Texas Extention Service as an entomologist. He is a graduate of Texas A & M, where he received his B. S. in agriculture in 1931 and his M.S. in entomology in 1936.

Dow Sets Up New Research Laboratory

Answering a long-felt need for more positive action in tackling industrial corrosion problems, The Dow Chemical Co., Midland, Mich., has set up a new laboratory in which emphasis will be given to the further study and development of magnesium for cathodic protection. Some of the specific projects to be given intensive consideration include the effect of metal composition on anode performance; the behavior of magnesium anodes in various electrolytes; the effect of operative, physical and metallurgical variables on anode performance; and the entire field of anode design. Extensive field work will be undertaken, correlating performance data with the laboratory program. Various other methods of corrosion prevention will also be investigated.

The new laboratory will be under the direct supervision of Harold A. Robinson, who for the past 15 years has been doing similar research on electromotive and corrosion problems in Dow's physical research laboratory. He has done considerable work in developing new magnesium alloys suitable for sacrificial anodes in cathodic protection, including those now in use.

S. H. Bivins Appointed Detrex Western Regional Manager

The appointment of S. H. Bivins as manager of western regional industrial sales has been announced by W. F. Newbery, industrial sales manager of the Detrex Corp., Detroit 3, Mich., manufacturer of industrial cleaning equipment, dry cleaning equipment, and chemical cleaning compounds.

Since joining Detrex in 1936, Mr. Bivins has been divisional manager in Milwaukee and St. Louis. Until his recent appointment, he held the position of divisional manager in Ohio, working out of the Cleveland office.

Mr. Bivins, whose headquarters will be in Chicago, Illinois, will bring to his new post a knowledge of a wide range of cleaning applications, having had years of experience in both the solvent degreasing and alkali phases of industrial metal cleaning.

Dampney Sales Staff Appointments

The Dampney Company of America, Hyde Park (Boston 36), Mass., announces the appointment to its sales staff of Kenneth E. Greene, assigned to the company's Chicago office, 53 West Jackson Boulevard, and of William T. Campbell to the Philadelphia office, located in the Bourse Building. Each is particularly well equipped to provide consultation and service on the use of Apexior and Thurmalox protective coatings in the power and processing fields.

Mr. Greene, a graduate of Johns Hopkins, has had broad engineering experience culminating in his previous several-years' affiliation with the Combustion Engineering Company and Hoffman Combustion Engineering Company.

Mr. Campbell, a 1922 graduate of Carnegie Institute of Technology, was for 14 years associated with the Elliott Company as a sales engineer in the Philadelphia area, and in 1944 became Philadelphia district manager for the H. K. Porter Company, Incorporated.

Joins Baker Instrument Company

Robert C. Hay, formerly with the sales department, E. I. du Pont de Nemours & Co., Inc., Plastics Division, has recently joined the Baker Instrument Co., Orange, N. J., manufacturer of chemical laboratory equipment and instruments.

To help increase "Take-Home Savings"

The Treasury Department has published two new booklets to help you and your employees realize the utmost benefit from your Payroll Savings Plan.

"Peacetime Payroll Savings Plan" for key executives offers helpful suggestions on the conduct of the Payroll Savings Plan.

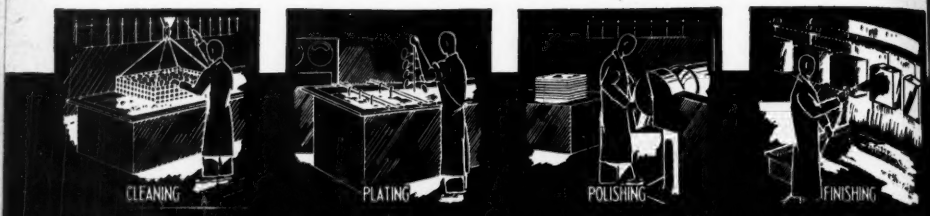
"This Time It's For You" is for distribution to employees. It explains graphically how this convenient, easy thrift habit works. It suggests goals to save for and how much to set aside regularly in order to attain their objectives.

If you have not received these two booklets, or desire additional quantities, communicate with your State Director of the Treasury Department's Savings Bond Division.

The Treasury Department acknowledges with appreciation the publication of this message by

PRODUCTS FINISHING

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and Advertising Council

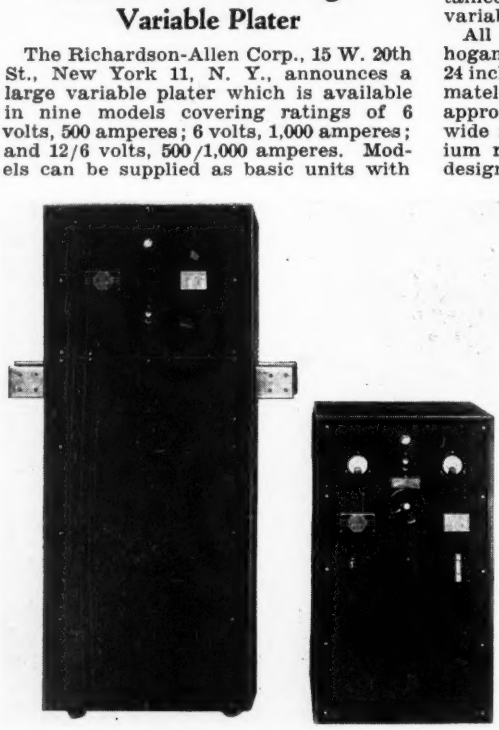


Richardson-Allen Large Variable Plater

The Richardson-Allen Corp., 15 W. 20th St., New York 11, N. Y., announces a large variable plater which is available in nine models covering ratings of 6 volts, 500 amperes; 6 volts, 1,000 amperes; and 12/6 volts, 500/1,000 amperes. Models can be supplied as basic units with separate remote control or as self-contained units with meters and stepless variable auto-transformer.

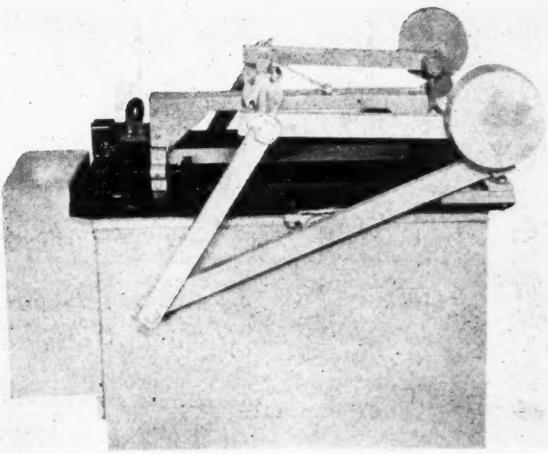
All units are finished in a rich mahogany wrinkle. Basic units are each 24 inches square x 60 inches high approximately. Remote control units are each appromiately 36¾ inches high x 21 inches wide x 15 inches deep. Long-life selenium rectifiers are employed. Units are designed for 220 or 440 volts, 3-phase 60-cycle current but are available for operation on 25-cycle current on special order.

Bus bars are provided on both sides of each plater cabinet for load connection, and efficient down-draft ventilation with oversize capabilities is also afforded. Units may be combined in series or parallel arrangement or both to increase voltage or current. The stepless variable auto-transformer per-



Richardson-Allen Large Variable Plater Basic Unit and Remote Control Unit

Lasalco Intermediate Barrel Plater



mits continuous control of output from "no load" to "full load."

Lasalco Intermediate Barrel Plater

To fill the need for a barrel plating unit between the capacities of the small utility and the regular size barrel plater, Lasalco, Inc., 2822-32 LaSalle St., St. Louis, Mo., is now introducing the intermediate barrel plater shown in the accompanying illustration. According to the manufacturer, loading and unloading of the unit are effected quickly and easily by means of a counterbalancing arrangement which automatically provides for the placing of the cylinder in the correct position where it is held through a handle and ratchet device. Loading trays are said to be unnecessary.

Additional advantages claimed for the unit are a switch type negative contact which is automatically made when the cylinder is loaded into the tank, and an insulated negative connection through the hollow hub of the cylinder which prevents interference while loading or unloading.

The Lasalco Intermediate Barrel Plater is arranged for three speeds, has a ⅛ h.p. motor and a 10 x 18-inch hard rubber cylinder with 8-quart or 30-lb. capacity, and is furnished with a steel tank for cyanide solutions or a rubber-lined tank for nickel solutions.

Attention ZINC PLATERS!

Cleanse and purify your zinc plating solutions

Use McKeon's Zinc-Brite TRADE MARK REG'D

"Throws down" impurities . . .

RESULT: Clean, even-plated, zinc.

Liberal sample . . . Full directions FREE!

SULPHUR PRODUCTS CO. • Greensburg 5, Pa.

Duridine 210 B

Duridine 210 B (the new name for 210 B Deoxidine) has been selected by the American Chemical Paint Co., Ambler, Pa., as a more descriptive name for the distinctive characteristics of the product. This designation is also intended to eliminate the confusion which occurred due to the properites of the product differing from those which characterize the original Deoxidines.

The thin, tight, relatively hard phosphate coating which is developed on metal surfaces when cleaned with Duridine 210 B is said to prevent rust and provide an adequate surface to bind paint to the metal for an enduring lustrous finish. According to the manufacturer, Duridine 210 B will not remove rust but prevents rust from developing under paint and also prevents rust from spreading under paint from metal exposed by deep scratches or other abrasions. The Deoxidines are best known as rust removers, rust inhibitors, and cleaners, leaving a very lightly etched surface which provides for maximum paint adhesion.

The Duridizing process is simple and is claimed to be well adapted for either small or large production plants. Three-stage washers suitable for alkali cleaning may be used. Easily controlled so as to permit the obtaining of uniformly good results, the process, it is stated, provides for the production of a dependable paint retaining and protecting surface.

CURVED FOR ACTION
EDMONT Neoprene-Coated work gloves are made on carefully formed molds that shape them to the hand -- no breaking in -- they're comfortable from the start. Add the soft napped feel of their fabric lining, the ease with which they can be put on and taken off and you see why EDMONTS are the favorite work gloves in leading industries from coast to coast.
ASK YOUR DEALER
Edmont
Fabric-Lined RUBBER GLOVES
509 Orange St. • • • • COSHOCTON, OHIO

Hytemp "Klearlak" Protective Coating

In response to the demand for a tough and durable coating that can be firmly bonded to metal, wood, or cementitious surfaces and possesses high ductility and elasticity, the George R. Mowat Co., 24 W. 40th St., New York 18, N. Y. has placed on the market a protective coating to be known as Hytemp "Klearlak." Fume-resisting, waterproof, and acid and alkali protective, the coating, it is claimed, will "set" with or without the necessity of heat.

According to the manufacturer, Klearlak dries clear and lustrous, will not flake or strip off, insulates against ordinary electric voltages, and is not affected by heat somewhat in excess of 500 deg. F. Used full strength for maximum protection, the coating dries to about 0.002 inch thickness, but may be thinned out to suit by the addition of turpentine or turpentine substitute thinner. A gallon of the material is said to cover over 650 square feet of metal.

Applicable by the brush, spray, or dip method, Klearlak can be used to provide a clear, hard, glass-like finish on metal for protection and beauty; to protect bright metal surfaces while in storage or in transit; to prevent rust and corrosion on iron and steel; to protect fans and ducts against corrosive fumes and gases; to seal the pores of unglazed ceramics and thus prevent absorption of liquids; to protect electric coils against atmospheric and other sources of corrosion, and so on. The material is available in 1 and 5-gallon cans and 50-gallon drums.

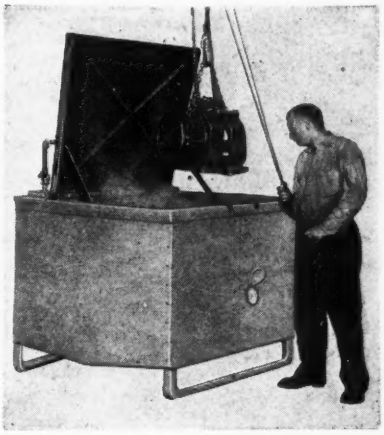
Aeroil Motor Block Cleaning Tank

A motor block cleaning tank specifically designed for the degreasing of Diesel motors, truck, tractor and similar large motor blocks has been brought out by the Aeroil Products Co., 5701 Park Ave., West New York, N. J. The unit is available in two models, both of which are used in connection with the hot dip alkali cleaning process, and is fully insulated and heated from the inside by means of a patented removable immersion tube system with the burner in a burner "well" within the fully insulated tank.

Standard equipment includes a built-in dial thermometer, heavy duty removable grilles, scum gutter, sludge drain, draw-off cock and double-braced hinged covers. Provision is also made for automatic heat controls for thermostatic temperature regulation from 100 to 550 deg. F. The equipment may be heated by city gas, manufactured gas, liquified petroleum gas, or kerosene. Thermostatic controls can be electrically operated from any normal lighting circuit.

The Model 25T features a normal dipping capacity of 270 gallons with a dipping space of 54 inches long x 38 inches wide x 30 inches deep. The inner shell is manufactured of 14 gauge steel.

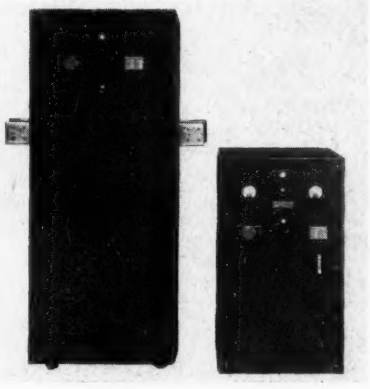
The Model 34T features a dipping space of 60 inches long x 38 inches wide x 36 inches deep with a normal dipping capacity of 355 gallons. This unit is manufactured of 12 gauge steel.



Aeroil Motor Block Cleaning Tank in Use

Large Variable Platers

NINE MODELS • EXTRA FEATURES



Supplied as Basic Rectifier with Separate Remote Control with Stepless Variable Transformer. Meters. Pilot Light. Also supplied as Self-Contained Rectifier with Meters and Stepless Variable Auto Transformer Control incorporated in same cabinet.

SPECIFICATIONS

6 Volts—500 Amperes Variable Plater
6 Volts—1000 Amperes Variable Plater
12/6 Volts—500/1000 Amperes Combined Unit
Basic Units may be used on either 220 Volts of 440 V, 3 Phase, 60 Cycles.

For special Selenium or Tube D.C. power requirements write for Rectification Questionnaire and literature.

Rectifier Division

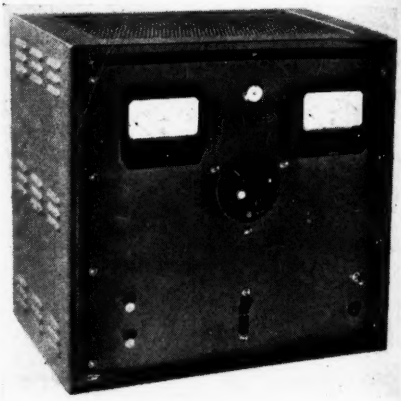
Richardson-Allen Corp.

15 West 20th St., New York 11, N. Y.

A FEW CHOICE TERRITORIES ARE STILL AVAILABLE

P.R. Selenium Plating Rectifier

A selenium plating rectifier specially designed for use with small tanks in plating shops is now being manufactured by the Pioneer Rectifier Co., 120 Cedar St., New York 6, N. Y. The rectifier can be used in connection with the performance of all types of gold, nickel, and chromium plating operations and can also be used for electrolysis drainage, cathodic protection of cables or pipe lines, laboratory work, and many other applications.



P.R. Selenium Plating Rectifier

The output of the P. R. Selenium Plating Rectifier may be raised from "no load" to "full load" by means of a convenient control knob mounted on the front panel. The unit is fully protected from short circuits by a circuit breaker which also acts as an "on and off" switch for the rectifier. A precision type voltmeter and ammeter provide accurate indications of output.

According to the manufacturer, selenium stacks cooled by natural air circulation provide for dependable and efficient operation of the rectifier, which includes no moving parts, thus eliminating maintenance or replacement of parts. Additional features of the rectifier include condenser filtering to eliminate ripple and an overload relay and fuse for the protection of the input circuit.

The P. R. Selenium Plating Rectifier is available in two models having different outputs.

Clean Spray Booths

Spray BOOTHCOTE on clean booth.
Paint peels off in sheets.
NO SCRAPING—SAVE TIME and LABOR
Trial offer 5 gal. $5.50 F.O.B. Buffalo
Used by 2000 leading manufacturers.
MONEY BACK IF NOT PLEASED.
Write for Circular.
HYGRADE FOOD PRODUCTS CORP.
HARRIS SOAP—BOOTHCOTE DIV.
19 Stetson St., Buffalo 6, N. Y.

Mr. Electroplater—You have been searching for years for an additive that would harden and render your silverplate tarnish resistant, at a reasonable cost. HERE IT IS . . .

GRANIUM CYANIDE

Write for new booklet describing this and other products.

GRANIUM PRODUCTS

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"Chemical Engineers Since 1905"

BARBER-COLMAN

TYPE YBA
TWO-POSITION VALVE

MOTOR-OPERATED VALVES FOR FINISHING CONTROL

Barber-Colman *electric* Motor-Operated Valves offer a number of advantages for the control of plating tanks, anodizing baths, and many other finishing operations where uniform temperature must be maintained for best results. Reliable shut-off is provided by positive power-driven seating. Current is consumed only when the valve is changing position. Motors are available for either high-voltage or low-voltage lines. Control can be by thermostat, by standard contact-making recorder-controller, or by remote manual switches.

Write for Bulletin
"CONTROLS FOR INDUSTRY"

BARBER-COLMAN COMPANY
1248 ROCK ST. • ROCKFORD, ILL.

THE PERFECT COMBINATION
SWENSON

- Infra Red Ovens
- Conveyors
- Dip Tanks
- Spray Booths

SWENSON ENGINEERING & MANUFACTURING, *Inc.*

2615 TWELFTH ST., DETROIT 16, MICHIGAN

Sales Engineering Offices:

WAGNER-GREEN COMPANY
Cleveland 15, Ohio

J. K. MUNHALL COMPANY
Buffalo 2, New York

M & W "Stylac" Coating

A high gloss protective and decorative coating for polystyrene plastics is announced by the Maas & Waldstein Co., 438 Riverside Ave., Newark 4, N. J. Known as "Stylac" the coating is an air-drying non-crazing lacquer which is claimed to have excellent adhesion and humidity resistance.

Stylac may be applied by the spray, dip, or brush method and can be used with concentrated (Fastol) colors to produce transparent effects.

Perma-Plug

The Perma-Plug, a device for readily stopping tank leaks and thus avoiding costly shutdowns, is now being marketed by the Perma-Line Products Corp., 1840 N. Damen Ave., Chicago 47, Ill. The device consists of a rubber-covered flange

Perma-Plug

and a threaded stud. When leaks occur, a hole is drilled through the tank and the Perma-Plug is inserted from the inside and held in place by means of a lock washer and nut applied to the stud on the outside of the tank.

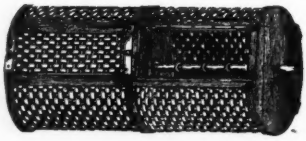
The Perma-Plug is available with a Neoprene, vinylite, or natural rubber flange covering, depending upon the purpose for which the plug is to be used. The entire metal assembly is cadmium plated before the rubber coating is applied. Metal assemblies of stainless steel can be furnished on special request.

The Perma-Plug is made in standard sizes of 2, 4 and 6 inches. Special sizes and shapes can be obtained on order.

"Chromalox" Type NOU Modified Oven Heater

Designed to operate at temperatures up to 950 degrees, an oven heater designated

Inexpensive, light in weight.
Easy to install and operate.



King White-Oak Plating Barrel

becomes a sub-anode, thereby producing a cleaner, brighter plate. Less plating time is required to put on the desired thickness of plate.

Send for catalogue and specification sheets.

JOHN KING 48 SPRINGFIELD ST. DAYTON 3, OHIO

For a real good polishing job use

KEYSTONE EMERY

TURKISH — NAXOS — AMERICAN

KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila., Pa.

WANTED

Plating rectifier agency for New England. Old established concern. References excellent. Display Room, 7 men on the road. Capable of handling service. Advise with full particulars.

H. LEACH MACHINERY COMPANY

387 CHARLES STREET — PROVIDENCE 4, R. I.

CLINCO

QUALITY FINISHES

METAL
LACQUERS AND ENAMELS
WRINKLES

AIR DRY AND BAKE SYNTHETICS
For Any Surface
For Any Product

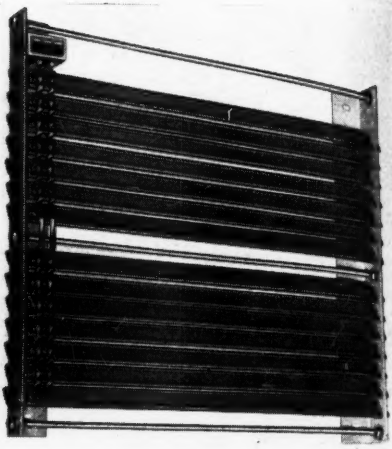
Write

THE CLINTON COMPANY

1210 ELSTON AVENUE — CHICAGO 22, ILLINOIS

as the Type NOU Modified has been added to its line of "Chromalox" heaters by the Edwin L. Wiegand Co., 7504 Thomas Blvd., Pittsburgh 8, Pa. According to the manufacturer, the construction provides for a high heating capacity in a small space. Heating element terminals are centralized at one end of the assembly, and all electrical connections are brought to a single enclosed terminal box to simplify wiring.

The assembly consists of 14 high temperature chrome steel sheathed strip heaters, providing a combined rating of 8 kw. at 230 volts. The heavy sheet metal

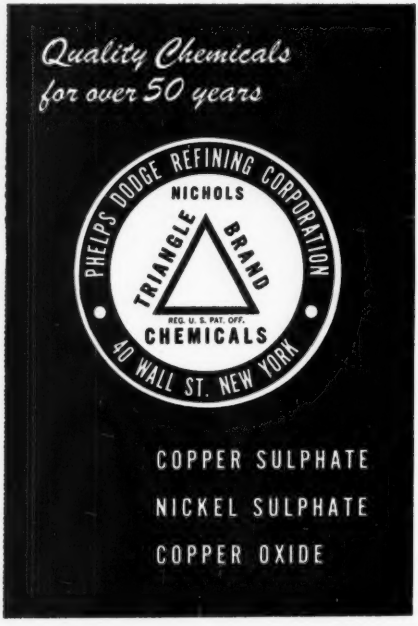


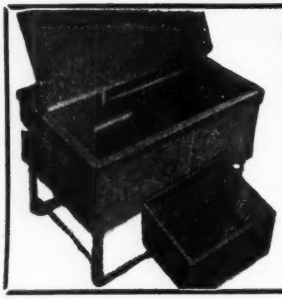
"Chromalox" Type NOU Modified Oven Heater

end brackets of the heater are punched to permit mounting of the unit on either the walls or bottom of the oven. The strip heater elements are mounted in the end brackets at a slight angle to the mounting surfaces to encourage air circulation if the heater is mounted on the walls of the oven.

On oven applications where forced air circulation is employed, the assembly may be used as an air duct heater with a slight change in the position of the strips. Any number of assemblies may be mounted in the air duct to increase the heating capacity.

The Chromalox Type NOU Modified Oven Heater is 33½ inches long x 28 inches high x 3 inches deep. Both the physical dimensions and the electrical rating may be altered to suit specific requirements.





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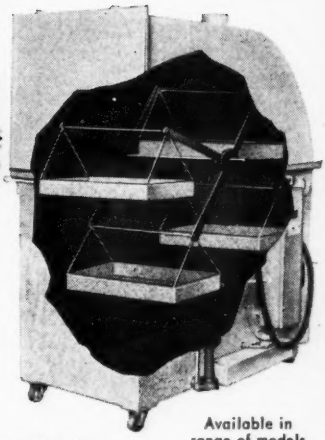

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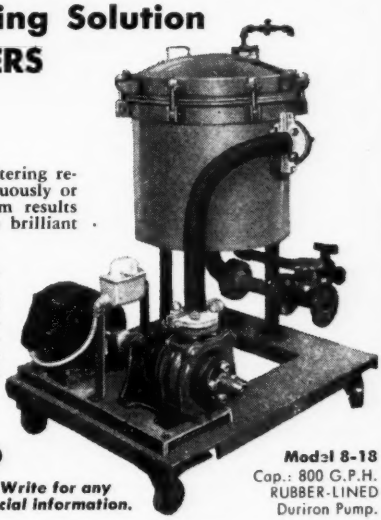

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Cap.: 800 G.P.H.
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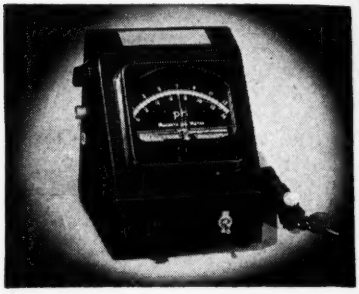
Pfaltz & Bauer Continuous-Indicating pH Meter

Pfaltz & Bauer, Inc., Empire State Bldg., New York, N. Y., is now offering a continuous-indicating direct-reading pH meter which is said to eliminate the need for dry cell batteries inasmuch as it is completely line operated. Thus, the meter can be left on continuously since the current consumption is extremely low. According to the manufacturer, the accuracy of the meter is 0.1 pH and its sensitivity is 0.05 pH.

Small and compact, the instrument is inclosed in a metal housing and has a



Pfaltz & Bauer Continuous-Indicating pH Meter

large, easily read scale graduated to 1/10 pH. The meter, which may be used in connection with a variety of electrodes, is furnished complete with simple instructions so that the untrained user can easily make ordinary pH measurements.

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Granium "B" Cyanide

Granium "B" Cyanide, a complex precious metal salt which when added to the electroplater's silver solution provides for the production of an unusually hard and tarnish-resistant plate, is now being marketed by Granium Products, 2616 Downey Rd., Los Angeles 11, California.

According to the manufacturer, the salt can be used in a percentage of from 15 to 75 per cent Granium to silver, depending upon the degree of hardness desired.

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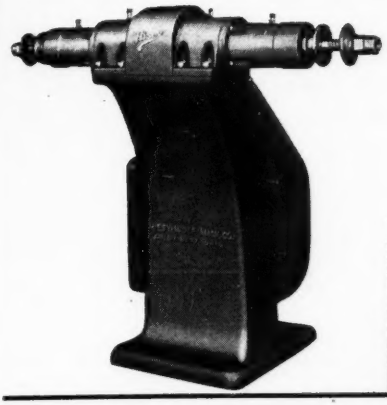

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Washing small precision parts *really* clean and discharging them at room temperature was the challenge given Howard recently by a large ball bearing manufacturer. The Howard design, combined Wash, Compressed Air Blow-off and Cooling to obtain excellent results, even better than requested.

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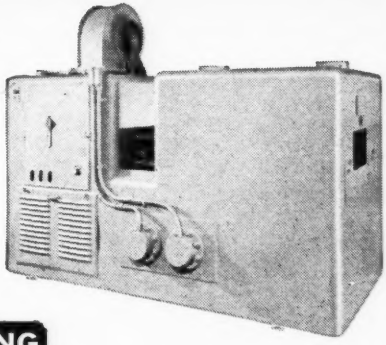

No. 354. Conveyor Cleaning machine washes parts absolutely clean and discharges them cold, ready for immediate inspection!

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According to the manufacturer, the compound, which has a high alkalinity, will rapidly remove stubborn grease, oil, and grime accumulations from the types of surfaces and materials on which steam cleaning equipment is employed without affecting paint or other finishes. An advantage claimed for the material is the fact that the solution need not be premixed. The water and cleaner, in correct proportion, are poured directly into the equipment tank and the solution is ready to use without agitation or other delay, it is stated.

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Featuring such properties as chemical inertness, unusual adhesion and flexibility, plus ease of application and fast drying time, a rack coating which is said to provide for maximum thickness with a minimum number of rack dips has been added to the line of "Tygon" products marketed by the U. S. Stoneware Co., Akron 9, Ohio.

Non-contaminating and easy to use, the coating is further claimed to be abrasion resistant, simple to repair, resistant to thermal shock, to withstand temperatures up to 250 deg. F., and to possess high electrical resistivity.

"Jetcote" Black Finishes

Known as the "Jetcote," a series of black protective coatings comprising a number of types, each of which is designed to meet specific requirements as to use and method of application, is announced by the Watson - Standard Co., 225 Galveston Ave., Pittsburgh 12, Pa. The finishes are said to be of particular interest to the lithographer, container manufacturer, and metal fabricator from the standpoint of appearance, fabrication, and increased resistance.

According to the manufacturer, reflector, stove, and heater producers will find the heat-resistant blacks suitable for service at elevated temperatures. Moreover, the Jetcote Black Finishes are said to find wide application in the production of toys, drums, pails, and other items subjected to abrasion and severe handling.

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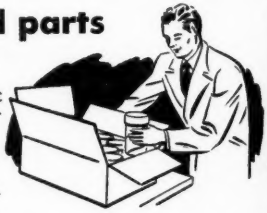

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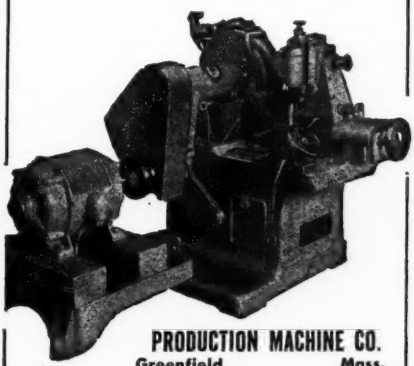

PRODUCTION MACHINE CO.
Greenfield Mass.

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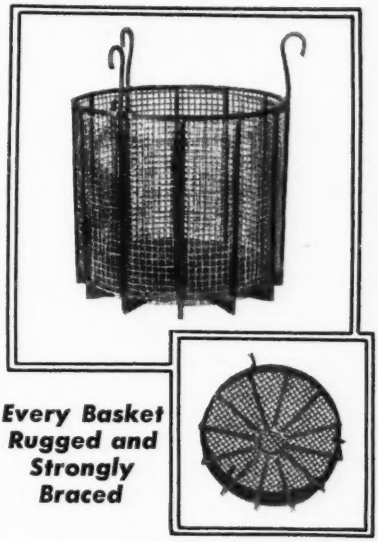

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Copy of the brochure is available free to national advertisers, agencies, and executives interested in point-of-sale merchandising, addressing requests on their company letterheads.

Maintenance Hints for Business Executives. Of particular interest to Latin American business executives and maintenance officials are three new booklets, each available in both Spanish and English, offered by Turco Products, Inc., Export Sales Division, P. O. Box 2649, Terminal Annex, Los Angeles 54, Calif. Fully illustrated, these booklets cover the fields of automotive maintenance and overhaul, aircraft maintenance and overhaul, and general industrial processing and maintenance operations, with complete information presented concerning new methods, products, and equipment.

Turco Bulletin AS-362, "How to Speed and Simplify Cleaning Methods in Industrial Plants", provides helpful information concerning rust removal, water-scale elimination, steam cleaning, paint stripping, metal surface treatment, and general maintenance.

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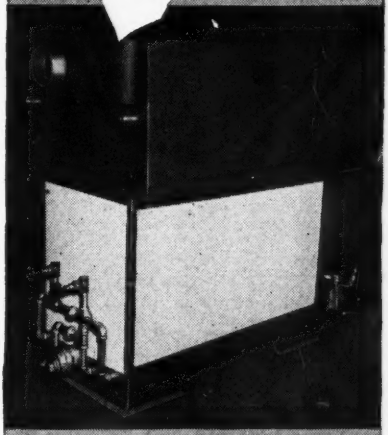

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